

**U.S. ARMY-BAYLOR UNIVERSITY GRADUATE PROGRAM  
IN HEALTH CARE ADMINISTRATION**

**A  
PATIENT CARE MODEL FOR HOUSING  
MEDICAL HOLD PATIENTS  
ASSIGNED TO  
BROOKE ARMY MEDICAL CENTER**

**A GRADUATE MANAGEMENT PROJECT  
SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE HCA PROGRAM**

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**FORT SAM HOUSTON, TEXAS  
MAY 1994**

**19950405 079**

## ACKNOWLEDGEMENTS

Few authors are capable of producing a work without the inspiration, support or input of others. My case was certainly an example of this. I am forever indebted to many individuals far too numerous to mention who provided assistance and encouragement in the completion of this project. Of special note are those individuals listed below, without whose help this project simply would not have been possible.

Above all others, my husband Frank, who has been the core of my support and strength throughout the Baylor experience. Without his understanding and love, coupled with his continuing encouragement to put forth my best possible effort, I could not have succeeded. This opus is dedicated to him with love.

Next, I must give special thanks to my "preceptors" - all three of them. To Colonel Douglas Barton, my initial preceptor, who started me on the GMP road and assisted with my project proposal. To LTC Ramon Sanchez, my interim preceptor, I am especially indebted for the encouragement, insight and open door offered throughout my residency year. Finally to Colonel Kurt Reamey, my final preceptor, who allowed me the necessary time to conduct and complete the research project and offered encouragement along the way.

Finally, I wish to thank the Company Commanders of the Medical Holding Company who began and will complete the "real life" aspects of this matter. To CPT Carol Fraser, who, in a sincere desire to make life better for her soldiers and families, first surfaced the housing issue and implored that it be resolved. And to her successor, CPT Cathy Beck, whose resolute dedication to her troops will, beyond a doubt, see the solution through.

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## ABSTRACT

Brooke Army Medical Center (BAMC) finds itself coping with a group of displaced inpatients who do not meet the criteria for remaining hospitalized. These displaced patients, assigned to the BAMC Medical Holding Company, are undergoing long-term rehabilitation or treatment regimens, or are awaiting processing through the Medical Evaluation Board process. BAMC maintains these displaced soldiers as inpatients due to a lack of feasible housing alternatives. This presents two major problems to the medical center. First, inpatient resources allotted to these displaced patients may be viewed as missed opportunities to treat new or additional patients. Second, patients and their families endure deleterious consequences such as negative psychological effects, separation and financial hardships.

The purpose of this study is to develop a patient care model describing the most efficient method for determining appropriate housing for displaced patients assigned to the Medical Holding Company at BAMC. A number of objectives supported completion of the study.

1. Analyze the current BAMC patient care model for medical hold patients.
2. Explore related trends in other DoD and civilian facilities.
3. Develop a feasible set of housing alternatives.
4. For each alternative determine the effects on the patient, family, BAMC and Fort Sam Houston.
5. For each alternative determine the Quality Assurance/Risk Management issues.
6. Develop a criteria set to rate and rank order each alternative.

7. Develop an algorithm which efficiently channels patients into the most suitable housing alternative.

There are two main goals of this study. The first goal is to maximize the medical benefit provided to medical hold patients and their families by providing the most appropriate setting for the patient's condition, thereby minimizing the difficulty of transitioning to the patient's new health state as well as minimizing financial and psychological hardships. The second goal is to minimize the resource drain of maintaining medical hold patients at BAMC.

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\* When used in this publication, the words "he", "him" or "men" are used to represent both the masculine and feminine genders unless otherwise stated.



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## CHAPTER 1

### INTRODUCTION

#### Conditions Which Prompted the Study

Currently, Brooke Army Medical Center (BAMC) finds itself coping with a group of "displaced" inpatients who do not meet the criteria for remaining hospitalized. For the purposes of this study, a displaced patient is an ill or injured active-duty soldier who is not medically fit to subsist alone in the medical holding barracks or has no local family to assist in his care, transportation or housing. These displaced patients, assigned to the BAMC Medical Holding Company, are undergoing long-term rehabilitation or treatment regimens, or are awaiting processing through the Medical Evaluation Board/Physical Evaluation Board (MEB/PEB) process. BAMC maintains these displaced soldiers as inpatients during their board processing due to a lack of feasible disposition alternatives. The duration of their stay may be weeks or months. During this time, BAMC and its staff serve as the patient's interim home and family; a surrogate arrangement which serves as a suboptimal solution for both the facility and the patient. The genesis of this study was a desire by the BAMC leadership to examine this situation and develop a more efficient patient care model.

Patients may fall into the displaced category for a variety of reasons. Ordinarily, medical hold patients are of a low medical acuity and in normal circumstances would be sent home to complete their rehabilitation, treatment or processing on an outpatient basis.

However, a lack of local housing and family support thwart this normal procedure. Many patients are assigned to BAMC from outside the local area and thus are displaced from their normal residence and family support structure. Other patients are single soldiers or geographical bachelors who live alone in local housing. In these cases, their physicians are reluctant to allow them to live alone until they are completely recovered.

Keeping these displaced patients as inpatients presents two major problems to the medical center. First, inpatient resources allotted to these displaced patients may be viewed as missed opportunities to treat new or additional patients. Thus, these low medical acuity patients drain nursing staff and beds away from more acutely ill patients. During the era when Medical Work Units (MWU) drove the reimbursement system, medical hold patients were welcomed as a low resource-intensive way to garner additional workload units and hence additional funding. In today's era however, the capitation budget arrangement rewards minimum, not maximum, lengths of stays for patients. Displaced patients now present an economic challenge to BAMC, which not only could utilize the beds and staff more efficiently for the care of acutely ill patients, but could be penalized economically for maintaining inpatients beyond the necessary length of stay limit.

Second, in addition to the deleterious effects of this arrangement on the hospital, negative consequences befall the patients and their families as well. Being hospitalized is often a less than pleasant experience and, given the choice, most people would opt for being released from the hospital as soon as possible. Lengthy hospitalization can occasionally result in negative psychological effects such as depression or confusion (Davis, 1990).

Additionally, the prolonged hospitalization of a family member is often a hardship upon the remaining family. In the case of a patient who is admitted to BAMC from a post far away, the patient's feelings of isolation and the family's difficulties are compounded by distance. Many family members, in an attempt to remain close to the patient, will relocate at their own expense to the BAMC area. Over the course of a lengthy rehabilitation or board process, the soldier and family can literally bankrupt themselves on hotel and other travel expenses.

There are a number of factors which contribute to making this a timely issue at BAMC. The issue was raised by the BAMC Medical Holding Company Commander who felt that the current system of maintaining these soldiers as inpatients was not only expensive and burdensome to BAMC, but failed to meet the financial and psychological needs of the soldier and his family. The Company Commander suggested shifting these patients to an outpatient setting to reduce costs to BAMC and assist the families by providing some form of government-sponsored housing in which the patient and family could be together at little or no personal cost. Additionally, the shortage of nursing staff, the move to capitation budgeting and the effects of a down-sized hospital operating budget all combine to add impetus to analyzing and solving the question of efficient housing disposition of BAMC's displaced Medical Holding Company patients.

#### Statement of the Problem

The alternatives to maintaining displaced patients as inpatients at BAMC are extremely limited. Additionally, BAMC has no efficient system to evaluate and place displaced patients in available housing options as they enter the medical hold system. What

are the various ways of housing displaced soldiers who are assigned to the BAMC Medical Holding Company? What are the issues concomitant with each of these alternatives? What are the quality assurance and risk management issues concomitant with each alternative? What effects will the different alternatives have in regard to the various Fort Sam Houston agencies involved, the soldiers and their families, other beneficiaries and the staff of BAMC?

### Literature Review

The purpose of the literature review is to locate relevant research pertaining to the issue of caring for and housing displaced patients in the civilian setting. However, civilian hospital facilities are not responsible for the housing and family support of patients to the same extent as is the military community. So, while there are no exact parallels to the Medical Holding Company in civilian hospitals or civilian literature, there are some analogous situations. For example, civilian facilities often face the problem of dispositioning a patient who is ready for discharge but has no home or family to which he can be discharged. In other cases, patients may require extended treatment or rehabilitation regimes at the medical facility, but not necessarily hospitalization.

Escalating costs and nursing shortages have forced the civilian medical community to solve the problem of displaced patient care by exploring programs which use fiscal and human resources more effectively and creatively (Lott, Blazey, and West, 1992). One specific factor spurring innovation in this area is that civilian hospitals realize that they cannot routinely serve as the surrogate home and family for displaced patients without eventually suffering financial disaster. Additionally, the patient-empowerment movement has given impetus to shifting more of the patient's care to the patient and family. Consequently, new patient care models such as self-care, cooperative care, alternative care units, medical hotels and case management have been developed and implemented throughout the civilian community as alternatives to traditional disposition methods.

Using these patient care models as topical search headings, a number of articles emerged relating to the BAMC study. Research demonstrated that civilian facilities are making significant progress in developing patient care models for displaced patients through a variety of strategies. Studying these civilian models provided insight into similar problems faced by military medical facilities like BAMC. Description of these models and their implementation methodology, (such as algorithms or protocols), could assist military policy-makers in designing more appropriate and cost-effective methods for coordinating care and housing of displaced military patients. A summary of the research on each civilian patient care model follows.

#### Self-care

One of nursing's primary goals can be broadly defined as assisting individuals in the attainment of a functional level of existence (Shestowsky and Phillips, 1984). The self-care patient model was developed to facilitate this goal. Self-care is defined as a process by which the patient takes the initiative and responsibility in acquiring the ability to function effectively in developing his own potential for self-care (Sarver and Howard, 1982). The process includes self-medication, self-directed activities, patient activities outside the treatment facility, extensive patient education and responsibility for routine daily activities.

Self-care involves rehabilitation and independence. Rehabilitation is concerned with aiding the patient in re-establishing his former state (Shestowsky and Phillips, 1984). For most medical hold patients however, the attainment of their former health state is doubtful, thus their inclusion in the MEB/PEB process. The rehabilitation goal in these cases becomes



helping the patient to reach the maximum state of health possible and to adjust to a new health condition or status. Thus, the rehabilitation process is intimately tied to the goal of independence. Civilian hospitals and rehabilitation centers find that incorporating self-care into the treatment regimen not only helps patients to transition from the hospital to the home, but is also an effective tool in reducing prolonged inpatient stays (Murray-Leslie, Jackson and Oakley-Roberts, 1991).

The self-care model has been in use for a decade. Long term civilian studies prove self-care decreases the inpatient length of stay and facility resource consumption, as well as, eases the patient's transition to the home environment. The self-care model could be adapted for use in the military medical inpatient or outpatient setting with some modifications.

### Cooperative Care

The cooperative or co-op care model began as a method by which hospitals could reduce the staff and resource burden inherent in caring for chronically ill patients. Self-care hinges upon the patient's ability to provide his own care; however, some patients are physically unable to do so in the complete absence of assistance. The New York University Medical Center made a revolutionary re-evaluation to help solve this predicament. The Medical Center staff looked at hospitalization not as an "interruption" of home life, but instead, as an "extension" of home life in a different setting. Thus, family members or friends become part of the healthcare team. They provide needed physical assistance, emotional support, treatment, transportation, observation, medication and nutrition care with

professional medical help available when required (Grieco, 1988; Grieco, et al, 1990). The Medical Center's cooperative care program involved both inpatients and outpatients. At the outset, the staff estimated a savings of 38.4% would be recognized on each participating inpatient. After ten years of the program, a cost saving analysis revealed a figure remarkably close to the estimate - 37.5% (Grieco, et al, 1990). A Kaiser Foundation study determined cooperative care can be tied to quicker recovery and cost savings in staff and ancillary services (Kaiser Foundation, 1985). Based on these early successes, the cooperative care program is spreading to many mainstream hospital systems including the Planetree System (Silbener, 1992).

In addition to helping the hospital reduce its staff and resource liabilities, the cooperative care system also eases the patient's transition to the home setting. Under the current system, the patient becomes dependent on the nursing staff for his care while in the hospital. Upon discharge, the patient is often and immediately forced into an independent care situation and a resultant difficult transition. Cooperative care transfers accountability for patient care and daily activities back to the patient and family while still under the supervision of the medical treatment facility. As hospitals discharge patients "quicker and sicker", the cooperative care approach eases the transition from hospital to home (Teschke, 1990). Like self-care, the cooperative care model could be adopted by the military medical system. This interactive care model emphasizes keeping medical hold patients and families together and provides an important component in maintaining the patient's individual dignity and feeling of self-determination during a difficult transition time.

### Alternative Care Units

Timely discharge of patients from civilian hospitals significantly impacts reimbursements. Elderly or chronically ill patients awaiting disposition in long-term care facilities or approved home care systems, present special challenges for hospitals and their staffs (Burgin and Schuetz, 1992). This situation is very analogous to medical hold soldiers awaiting disposition through the MEB/PEB system. Civilian health care facilities have responded with the alternative care unit (ACU), also known as the subacute or transitional care unit (Fowler, 1992). This model fills a void in the continuum of care by providing a less-costly setting for inpatients who no longer need hospitalization, but who are not ready for outpatient self-care, cooperative care or home care. The average ACU is a separate area of the hospital which provides a multi-system level of care through an integrated program of medical and nursing care, social services, nutritional support, and rehabilitation services. The facility benefits in two ways. First, placing patients in a low intensity care setting conserves hospital resources. Second, these cost-saving centers garner third-party reimbursement as rewards from insurers and managed care companies who encourage such moves (Fowler, 1992). BAMC would experience both of these financial benefits through adoption of the ACU model.

### Medical Hotels

The shift to outpatient care spawned yet another civilian approach to the problem: medical hotels (Powills, 1986). The pressure to move patients out of high cost acute care settings and reduce lengths of stay generated the hotel movement. The collocation of such a

hotel with their respective medical facility provides easy access to follow-up care.

Additionally, this arrangement allows the patient's family to remain with the patient and assist in cooperative care efforts. Medical hotels could be especially attractive to high occupancy military medical centers for patients who do not require the expensive inpatient setting but do require intermittent care, rehabilitation, or follow up services. Again, like the self-care and cooperative care models, this option allows cost savings, encourages independent action, fosters patient-family cohesion, and frees up beds for acutely ill patients (Burns, 1992).

The establishment of such a program typically requires an enormous start up investment. Acquisition of a medical hotel is addressed in the literature not as a money making venture, but as a long-term attempt to regain costs normally lost to housing low acuity patients in high acute care areas. This same rationale would be the impetus behind such a venture in the military setting. The construction of a new facility or renovation of an existing one at BAMC could serve as a hotel for displaced patients and their families.

### Case Management

Case management is a patient care model of health care delivery that encompasses the essence of managed care but necessitates appointment of a case manager to be accountable for the activities and outcomes of a specific case type or patient population (Marr and Reid, 1992). The functions of case management are both facilitating and gatekeeping in that the goals are to provide quality, comprehensive care to patients while containing costs (Maurin, 1990). Patients with case types which are costly, complex or involve long hospitalization

benefit the most from case management.

The core features of this model include assessment, planning, linkage, advocacy, and monitoring by an assigned case manager (Chamberlain and Rapp, 1991). Case managers, who may be nursing or non-nursing personnel trained in case management, are concerned with the totality of the person's needs (medical, social, educational, vocational). The case manager ensures that the patient is able to access appropriate health services in the appropriate setting and meet basic living needs (Maurin, 1990).

Beyond the core features, there is a great deal of variety in the operational definition of case management, as well as its impact on outcomes. Several investigators have attempted to assess the outcome of case management with mixed results - (Bond, 1988; Franklin, 1987, Fisher, Landis and Clark, 1988; Goering et al, 1988; and Borland et al, 1989). While some studies showed that case managed patients experienced significantly lower rates of re-hospitalization and higher levels of functioning than control groups, other studies found no difference based on case management application.

It is difficult to imagine that helping patients find their way through the maze of services available to address their health and basic living needs would not be valuable to them. Adopting such a program at BAMC could save resources by reducing length of stay and ensuring patients were receiving care in the most appropriate setting. Additionally, patients and their families would benefit by assistance in meeting their basic living needs.

### Algorithms

Clinical algorithms, and their close relation, clinical protocols, have long been

employed in the healthcare sector to assist providers and staff in rapidly and consistently analyzing patient needs and providing the appropriate services. The use of algorithms in the medical community grew out of a need to focus on managing and controlling health care costs and quality through standardization (Wiesel and Michelson, 1986). An algorithm is a procedure consisting of a list of steps or instructions used to accomplish a task in a standard manner (Mitchell, 1984). Algorithm procedures have five characteristics: (1) a unique starting step followed by a sequence of steps executed in a default order until an explicit termination is executed, or the list of steps is exhausted; (2) each step is performed individually with finite effort; (3) each step individually is unambiguous; (4) the algorithm allows for a variable (but not infinite) number of steps to be executed by looping and branching through the steps listed; and (5) when termination is reached, the execution sequence has calculated correctly the desired object of the algorithm (Mitchell, 1984).

Clinical algorithms serve as a way to organize thought in a visible manner. The basic goal of clinical algorithms is to identify how factors and considerations should be uniformly applied to divide patients into subcategories that are best treated differently (Hadorn, et al, 1992). They have been used by medical providers to teach complex procedures, aid in decision making, and conduct retrospective case review. To be useful, any algorithm should be capable of universal application to all types of patients and should present an unbiased picture to the medical or administrative staff.

An algorithm developed to assist the Medical Holding Company staff place patients in appropriate housing should be considered by BAMC for two reasons. First, an algorithm could help to streamline a currently indiscriminate process and serve to increase patient

satisfaction. Additionally, deriving a consistent approach through the development and use of an algorithm could allow BAMC to consistently and more efficiently apply its limited resources.

### Literature Summary

The literature suggests a number of civilian patient care models which could be adapted for use in the military setting. The alternatives suggested in this study for a new patient care model at BAMC will reflect many of the lessons learned by civilian institutions.

### Purpose

The purpose of this study is to develop a patient care model describing the most efficient method for determining appropriate housing for displaced patients assigned to the Medical Holding Company at Brooke Army Medical Center. A number of objectives will be used to support completion of the study.

1. Analyze the current BAMC patient care model for medical hold patients.
2. Explore related trends in other DoD and civilian facilities.
3. Develop a feasible set of housing alternatives to the current BAMC care model.
4. For each alternative determine the financial, psychological and political effects on the patient, family, BAMC and Fort Sam Houston.
5. For each alternative determine the Quality Assurance and Risk Management issues.
6. Develop a criteria set to rate and rank order each alternative.
7. Develop an algorithm which efficiently channels patients into the most suitable

patient care model for housing.

There are two main goals of this study. The first goal is to maximize the medical benefit provided to medical hold patients and their families by providing the most appropriate setting for the patient's condition, thereby minimizing the difficulty of transitioning to the patient's new health state as well as minimizing financial and psychological hardships. The second goal is to minimize the resource drain of maintaining medical hold patients at BAMC.

A number of anticipated constraints will be addressed in this study. These include limited hospital and other activity budgets, limited billeting on Fort Sam Houston, insufficient BAMC staff and a constrained patient transport system.



## CHAPTER 2

### METHODS AND PROCEDURES

The methods and procedures in this study were selected to support seven study objectives. The initial five objectives will investigate pertinent study data and then build upon this data to develop housing alternatives. The sixth objective will employ criteria to evaluate and rank the housing alternatives. The final objective will design a suggested algorithm to implement the primary alternative.

OBJECTIVE ONE: Analyze the current BAMC patient care model for medical hold patients. Analysis and documentation of the current model are fundamental to achieving effective change. This analysis will serve to identify existing conditions, needs, problems, and create opportunities to develop a new model that will more effectively meet the needs of the organization and patients.

METHOD/PROCEDURE: This study employs two methods to examine and describe the current model: work flow analysis of the current system and demographic analysis of the patient population.

OBJECTIVE TWO: Explore related trends in other Department of Defense (DoD) and civilian facilities faced with similar problems.

METHOD/PROCEDURE: Contact at least five DoD military medical treatment facilities

(three large medical facilities and two smaller medical facilities throughout various CONUS regions) to determine their method of housing similar Medical Holding Company patients. Examine civilian literature for related trends and solutions to similar issues. Identify useable information or other lessons learned that could be applied to the development of BAMC's patient care model.

In order to achieve this objective, a telephone interview questionnaire (see appendix 1) was developed to examine how five military facilities allocated housing for medical hold patients. The medical facilities were chosen based on varying rationality. Walter Reed Army Medical Center (WRAMC) was selected since it has comparable size and workload to BAMC. Fitzsimmons Army Medical Center (FAMC) was selected since it, unlike most medical facilities, owns the installation where it is located. Ownership may provide FAMC with unique opportunities for handling this medical hold question. Wilford Hall Medical Center (WHMC - United States Air Force) was also chosen based on its comparable size and workload to BAMC. Additionally, WHMC, like BAMC, is located in the San Antonio area and thus faces many of the same environmental and community challenges. The two smaller medical facilities, Fort Hood Medical Activity (Darnall Army Community Hospital - DACH) and the Fort Bragg Medical Center (Womack Army Medical Center - WAMC), were selected as representing a medical facility within and without BAMC's region.

**OBJECTIVE THREE:** Develop a feasible set of housing alternatives to the current BAMC care model.

**METHOD/PROCEDURE:** Based on discussions with subject matter experts (Medical

Holding Company staff, the BAMC Troop Command Battalion Commander, Chief of the Patient Administration Division, the Quality Assurance Chief, nursing personnel, social workers, etc..) and considering the goals of the study, generate a feasible set of alternatives for housing medical hold patients.

OBJECTIVE FOUR: Determine and evaluate the effects (i.e. financial, psychological, political) of each alternative on patients, families, BAMC and Fort Sam Houston.

METHOD/PROCEDURE: Use resource management data and subject matter expert interviews to determine the financial impacts of each of the alternatives. Consider costs to include staffing, physical facility overhead, supplies, construction and renovation etc.. Collaborate with the Medical Holding Company staff, social workers and psychologists, patient representatives, and pastoral staff members to identify the likely financial and psychological effects on the patient and family resulting from each alternative. Examine historical congressional files to determine past financial and psychological issues which occurred related to medical hold patients. After identifying the BAMC and post resources required to support each alternative, determine the financial and political impacts upon BAMC and post agencies through discussion with these agencies.

OBJECTIVE FIVE: Determine the Quality Assurance and Risk Management issues for each alternative.

METHOD/PROCEDURE: In concert with BAMC's Quality Assurance (QA) and Risk Management (RM) staff, identify the QA/RM issues concomitant with each alternative. To

meet this objective, a round-table discussion will be held with the BAMC program coordinators for Quality Assurance and Risk Management.

OBJECTIVE SIX: Develop a criteria set to rate and rank order each alternative.

METHOD/PROCEDURE: A set of criteria will be developed through interviews with subject matter experts. Next, an expert panel will be asked to weight the criteria in as objective a manner as possible through a survey instrument. The list of the expert panel members and the survey instrument are shown in Appendixes 2 and 3, respectively. The survey rating scale used will be a five-point, bipolar adjective scale anchored at the points. The weighted criteria will then be incorporated into a Judge Model of decision making for selecting the best alternative.

OBJECTIVE SEVEN: Develop an algorithm which efficiently channels patients into the most suitable housing through the use of an appropriate patient care model.

METHOD: Create an algorithm for BAMC's Medical Holding Company staff to consistently apply in assessing patient housing needs. An algorithm is a procedure consisting of a list of steps or instructions used to accomplish a task in a standard manner (Mitchell, 1984). This study began by identifying what factors determine the best alternative suitable for a displaced medical hold patient. From these factors, an algorithm will be developed for sorting displaced medical hold patients so that the most suitable patient care alternative for housing is applied.

### Ethics

Throughout this study, patient information in the form of medical records, congressional files, patient representative files, and other formats were examined. The Privacy Act and other patient protection policies require extreme diligence and, among other things, preclude disclosure of names, social security numbers or other personal data. The patient information involved in this study is presented only in statistical form (trends, charts) or anonymous vignettes used to illustrate a pertinent point. Anonymity of all participants (patients and interviewees) has been protected and used only with expressed permission. Appropriate credits, recognition and source quotes are provided in all cases.

## CHAPTER 3

### RESULTS

The results of this study are presented in order of supporting objectives.

#### OBJECTIVE ONE: Analysis of the Current BAMC Model

##### Work Flow Analysis

The first step was a work flow analysis (WFA) reflecting the current BAMC patient care model for medical hold patients. Periodic work flow analysis is important in maintaining the quality of an organization's work because systems that work smoothly and effectively support quality, rather than impede it (Gilbert, 1990). The WFA contained herein documents the flow of patients through the BAMC care model. This diagrammatic account of the work flow provides an objective basis for the work flow discussion, verifies how the process works, and provides a permanent record of the current model (Gilbert, 1990). The information needed to build the WFA was obtained through personal interviews, observation and policy research. Two WFAs emerged to portray the current BAMC patient care model for medical hold patients. They reflect two simultaneous processes occurring within the medical holding system. The first is a depiction of the duty status processing of patients through the current model. Duty status processing reflects the various categories of duty status (i.e. present for duty, hospital, convalescent leave, medical hold) to which a patient can be assigned during treatment for an illness or injury. The second reflects the housing process patients experience while assigned to the Medical Holding Company.

In fig. 1a and 1b, the duty status processing of a patient is portrayed. It begins with

an active duty soldier who enters the medical system. The patient moves through a series of decisions made by his medical providers. Based upon his condition, he may ultimately be assigned to the Medical Holding Company. Once assigned to the Medical Holding Company, the patient's case moves through a series of decisions based upon continued treatment and evaluation by his providers or processing by the Medical Evaluation Board and/or Physical Evaluation Board. The conclusion is a permanent disposition back to duty or transition to civilian life.

In fig. 2a-c, the simultaneous housing process is displayed. The process begins with a patient already assigned to the Medical Holding Company. Since not all medical hold patients must remain in the hospital or even be admitted at all, the initial question deals with whether the patient can be maintained as an outpatient. The WFA moves through a series of decisions which the medical hold patient faces in obtaining housing for the duration of his attachment or assignment to BAMC's Medical Holding Company.

## DUTY STATUS WFA PART I

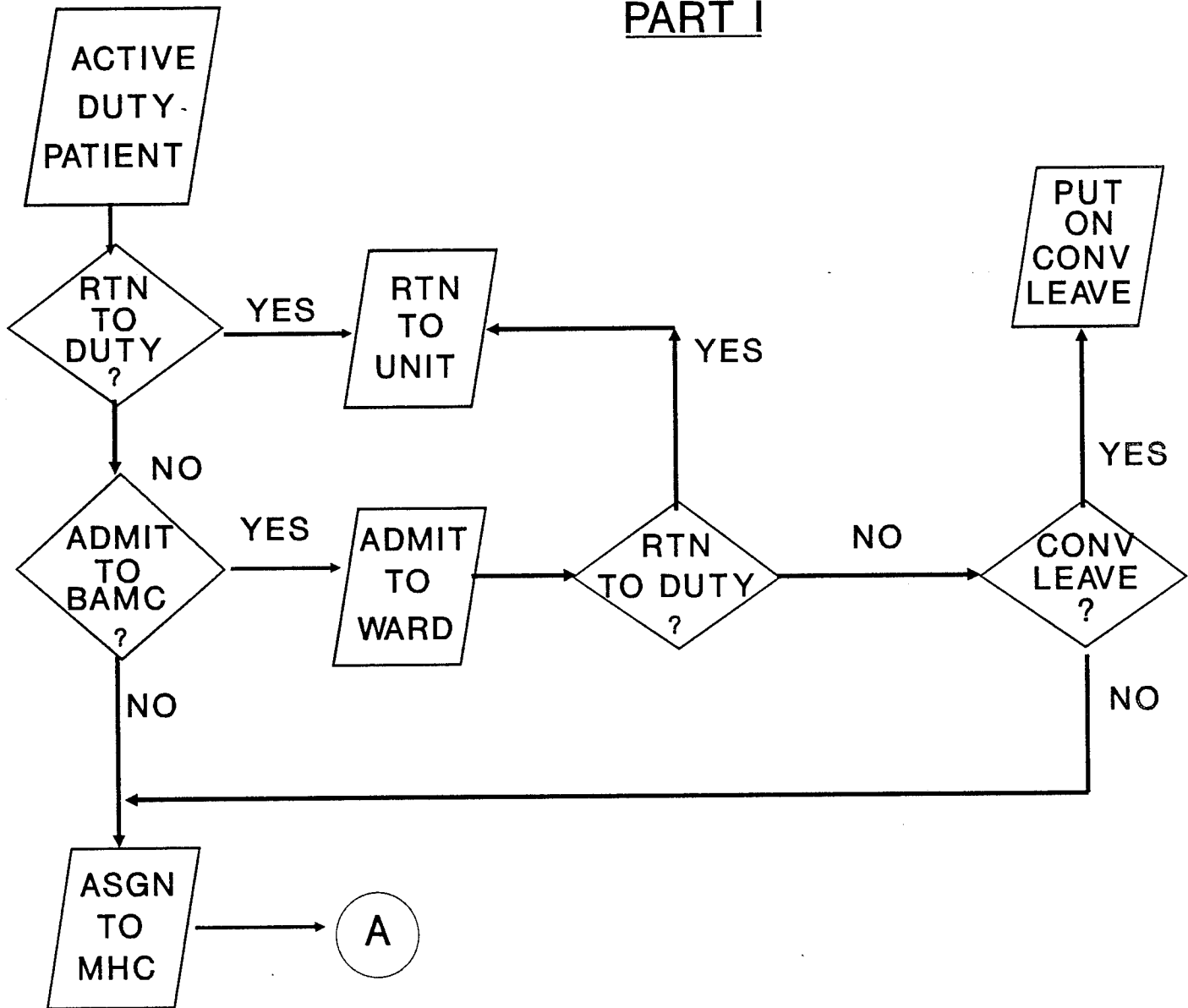


Fig. 1a. Work Flow Analysis portraying the Duty Status Processing for Medical Holding Company patients under the current BAMC patient care model.



## DUTY STATUS WFA PART II

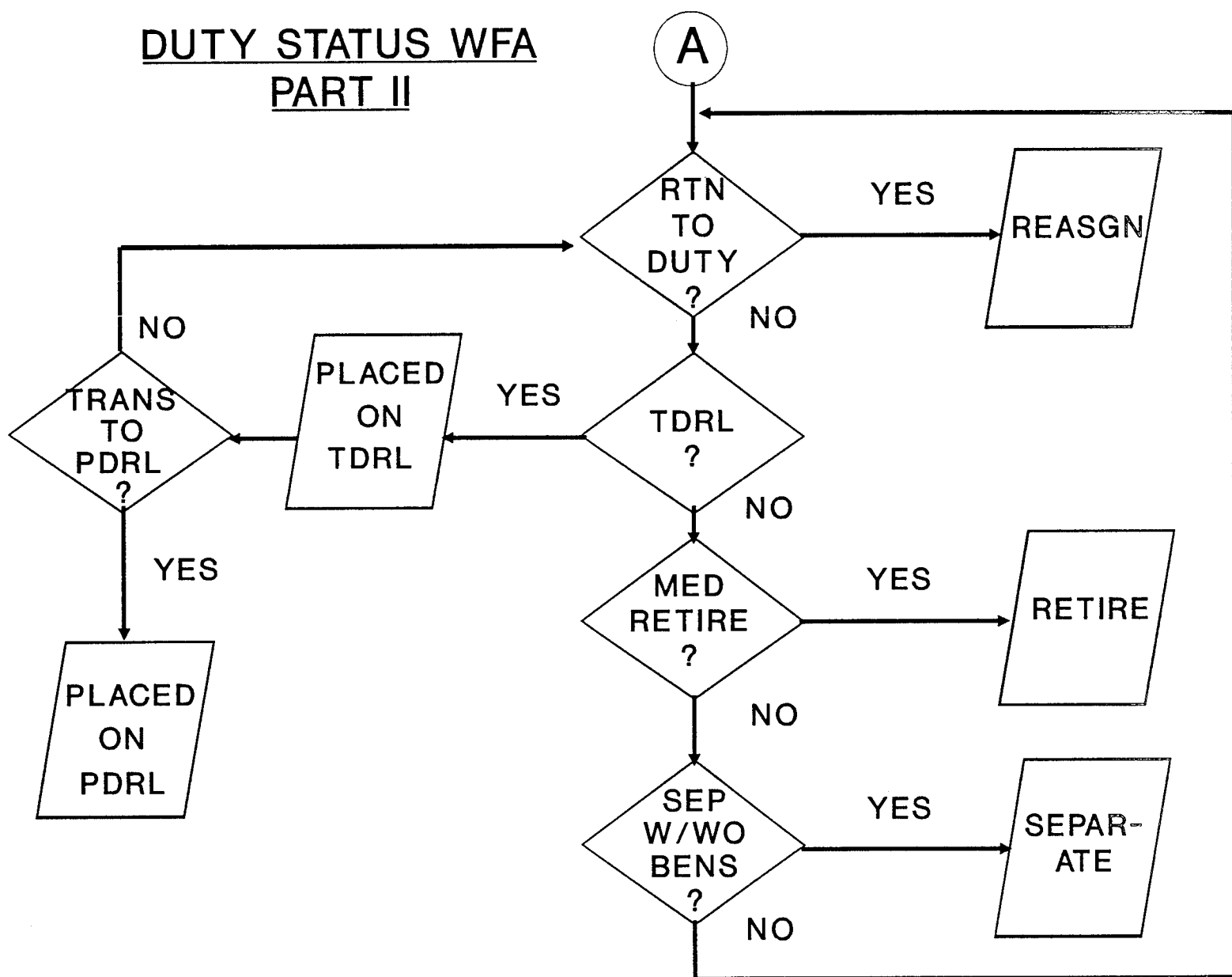


Fig. 1b. Work Flow Analysis (continued) portraying the Duty Status Processing for Medical Holding Company patients under the current BAMC patient care model.

# HOUSING WFA PART I

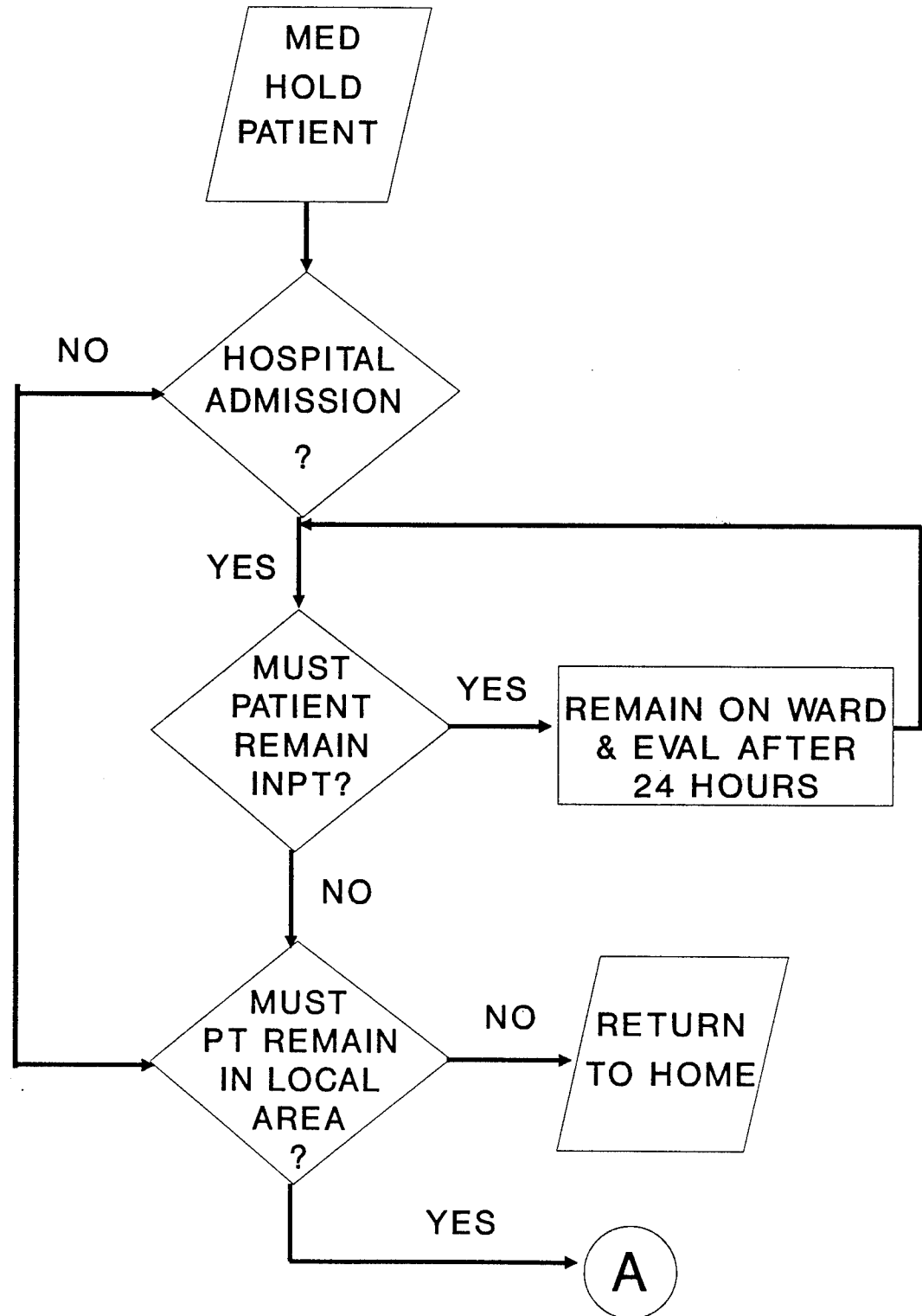


Fig. 2a. Work Flow Analysis depicting Housing for Medical Holding Company patients under the current BAMC patient care model.

# HOUSING WFA

## PART II

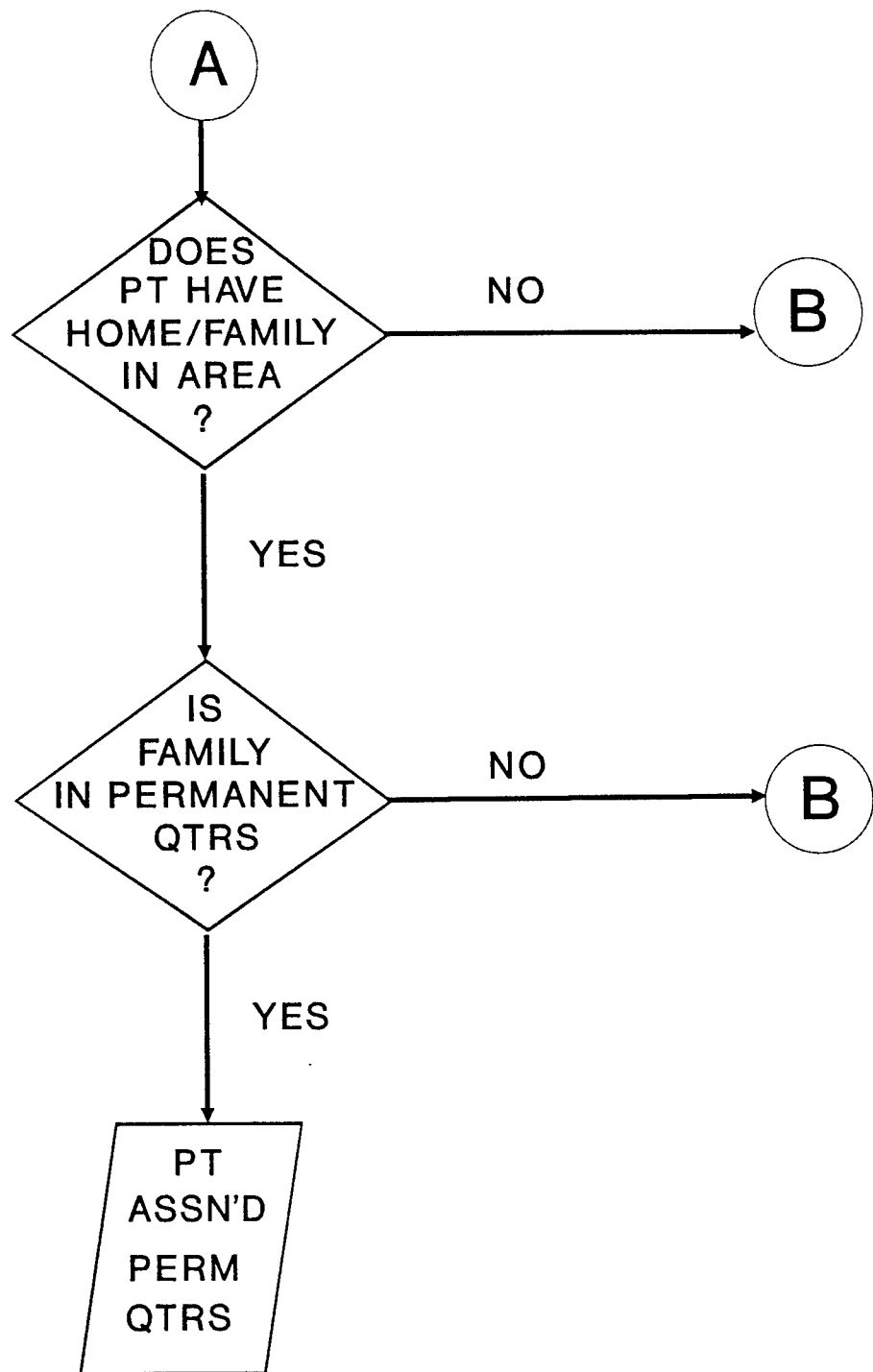


Fig. 2b. Work Flow Analysis (continued) depicting Housing for Medical Holding Company patients under the current BAMC patient care model.

## HOUSING WFA PART III

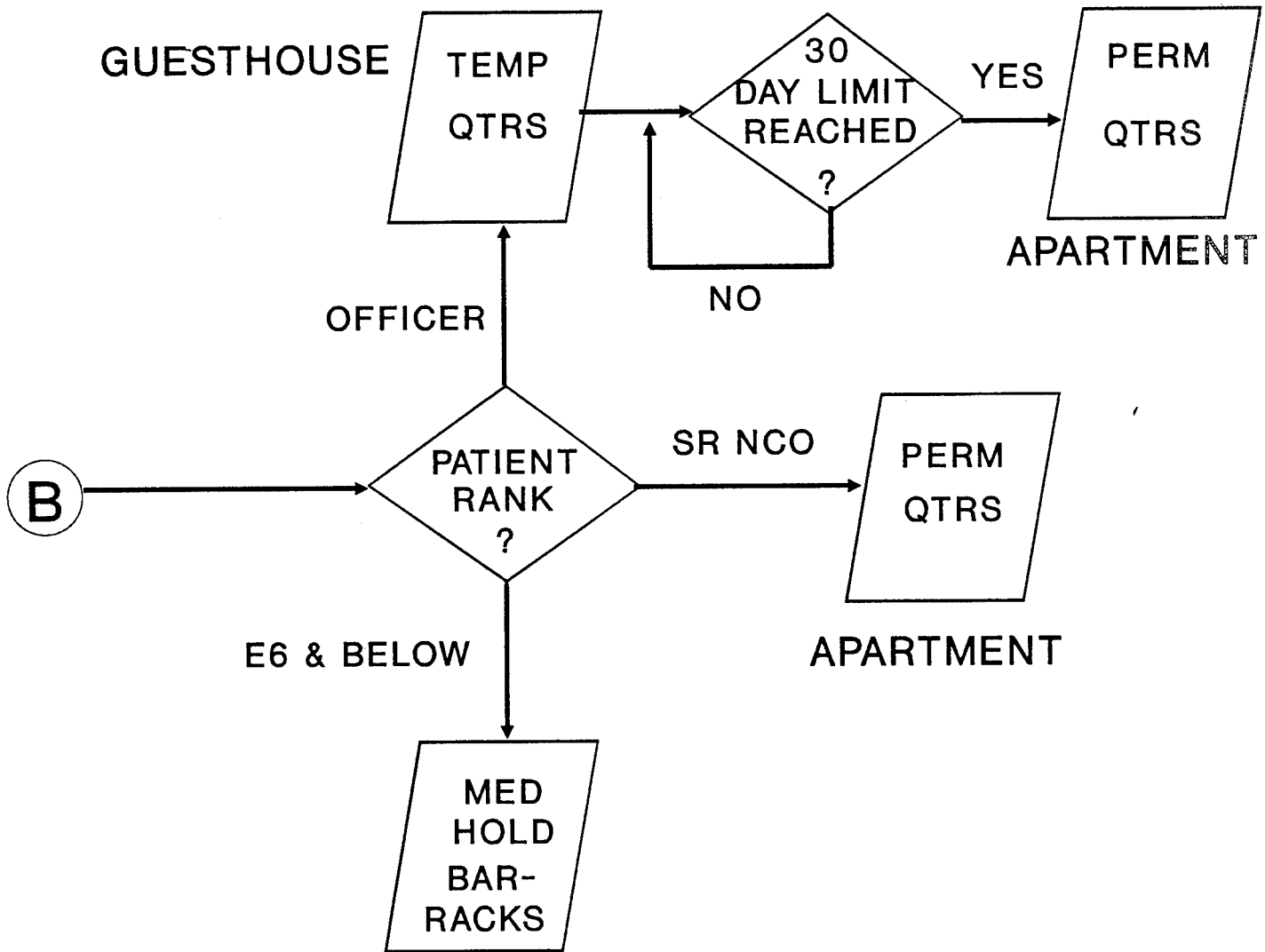


Fig. 2c. Work Flow Analysis (continued) depicting Housing for Medical Holding Company patients under the current BAMC patient care model.

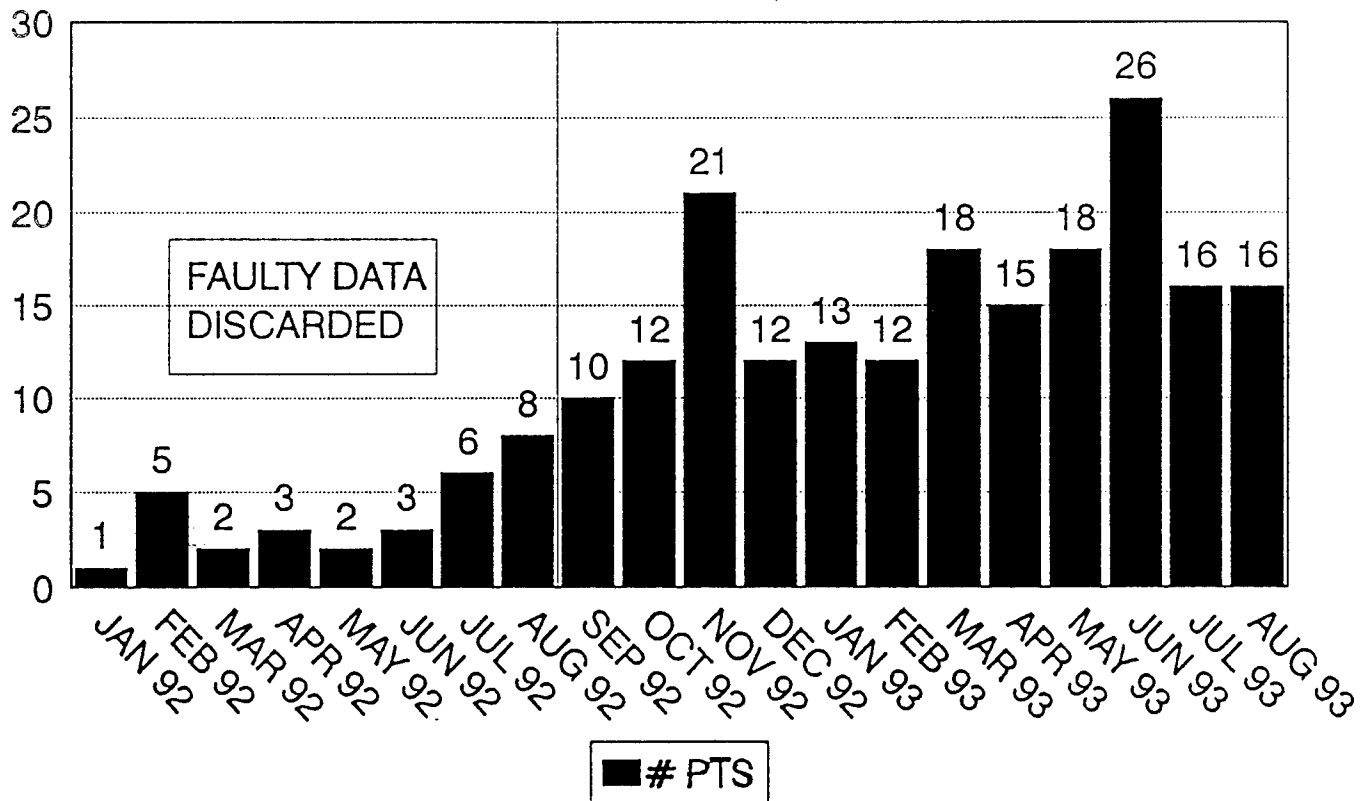
### Demographic Analysis

The second step in analyzing the current BAMC model, was execution of a demographic analysis of the medical hold patient population. This analysis used analytical tools (run charts, histograms, pareto charts) to determine the magnitude of the housing problem and identify trends in the patient population using twenty months of patient data provided by the Medical Holding Company staff. Additionally, the study calculated, using the same historical data, the average number of patients, their average lengths of stay, distribution by medical categories, distribution by diagnosis, and geographic distribution.

At the study's outset, the Medical Holding Company staff had twenty months of patient data available for inclusion in this study (January 1992 through August 1993). The data provided detailed information on each new patient assigned to the Medical Holding Company by month. During this twenty month period, 209 new patients were assigned. A depiction of the assignment trend is shown in fig 3. An analysis of this trend revealed problems in the data set, since the first eight months of data appear to be inconsistent with the remainder of the data set. A large increase in monthly gains is apparent after August 1992. A discussion with the Medical Company Commander and First Sergeant revealed no real increase of patients being assigned to the Medical Holding Company after August 1992. However, there was an improvement in record keeping methodology in August 1992 which more accurately captured patient accessions, and hence reflected the increasing numbers beginning in August 1992. Since the data set prior to September 1992 was not reliable, it was dropped from the study. The remaining twelve months of data gave a sample patient population of 179 ( $n = 179$ ).

Figure 3 displays the distribution of patients by month of assignment to the Medical Holding Company. As discussed previously, the initial eight months of data were excluded from the analysis.

## MEDICAL HOLDING COMPANY NEW ASSIGNMENTS BY MONTH



A demographic analysis completed for this patient set included the following descriptive characteristics: age, gender, marital status, rank, geographic origin, diagnosis, length of stay and total number of days spent in the BAMC area. The results are shown in the following six tables. An in-depth discussion and analysis of these tables is presented in Chapter 4. Immediately following these tables are figures 3 and 4 which depict the number of patients assigned to the Medical Holding Company by month and the distribution of patients based upon primary clinical service. Table 1 depicts the age distribution of the sample population upon entering the Medical Holding Company.

TABLE 1  
AGE GROUPINGS OF MEDICAL HOLD PATIENTS  
IN SAMPLE POPULATION

AGE (YEARS)	NUMBER OBSERVED	PERCENTAGE OF TOTAL
18 - 24	65	36.3
25 - 29	31	17.3
30 - 34	27	15.1
35 - 39	29	16.2
40 - 44	12	6.8
45 - 49	14	7.8
50 & >	1	0.5

Table 2 depicts the gender distribution of the sample population.

TABLE 2.

GENDER DISTRIBUTION OF MEDICAL HOLD PATIENTS IN SAMPLE POPULATION

<b>GENDER</b>	<b>NUMBER OBSERVED</b>	<b>PERCENTAGE OF TOTAL</b>
MALE	149	83.3
FEMALE	30	16.7

Table 3 depicts the marital status of the sample population upon entering the Medical Holding Company.

TABLE 3

MARITAL STATUS MEDICAL HOLD PATIENTS IN SAMPLE POPULATION

<b>MARITAL STATUS</b>	<b>NUMBER OBSERVED</b>	<b>PERCENTAGE OF TOTAL</b>
MARRIED	113	63.1
SINGLE	66	36.9



Table 4 depicts the rank distribution of the sample population.

TABLE 4

RANK DISTRIBUTION OF MEDICAL HOLD PATIENTS IN SAMPLE POPULATION

GRADE	NUMBER OBSERVED	PERCENTAGE OF TOTAL
E-1 - E-4	95	53.1
E-5 - E-6	39	21.8
E-7 - E-9	28	15.7
WO	3	1.6
O-1 - O-3	7	3.9
O-4 - O-6	7	3.9

Table 5 depicts the geographic origin of the sample population. Geographic origin is defined as where the patient was assigned for duty at the time he was transferred to the BAMC Medical Holding Company. The originating locations are broken down into four categories: local, region, other CONUS, and OCONUS. Local includes all patients who were assigned to Fort Sam Houston, Texas or other military facilities located within the confines of Bexar County. The region designation includes all patients assigned within BAMC's Region 6 scope of responsibility: Fort Hood, Texas; Fort Polk, Louisiana; Fort Sill, Oklahoma and Panama. Patients in the "other CONUS" group are those assigned to any military facility outside of BAMC's Region 6, but still within the confines of the continental United States. The OCONUS group encompass all patients who originated from overseas assignments, i.e. Germany, Korea, Alaska, etc..

TABLE 5

GEOGRAPHIC ORIGIN OF MEDICAL HOLD PATIENTS IN SAMPLE POPULATION

<b>GEOGRAPHIC ORIGIN</b>	<b>NUMBER OBSERVED</b>	<b>PERCENTAGE OF TOTAL</b>
LOCAL	27	15.1
REGION	60	33.5
OTHER CONUS	34	18.4
OCONUS	58	32.4

Table 6 shows the mean and range of patient stays in days. Two areas are shown; length of stay (LOS) as an inpatient in BAMC and the total number of days the patient remained in the BAMC area awaiting final disposition, to include inpatient days.

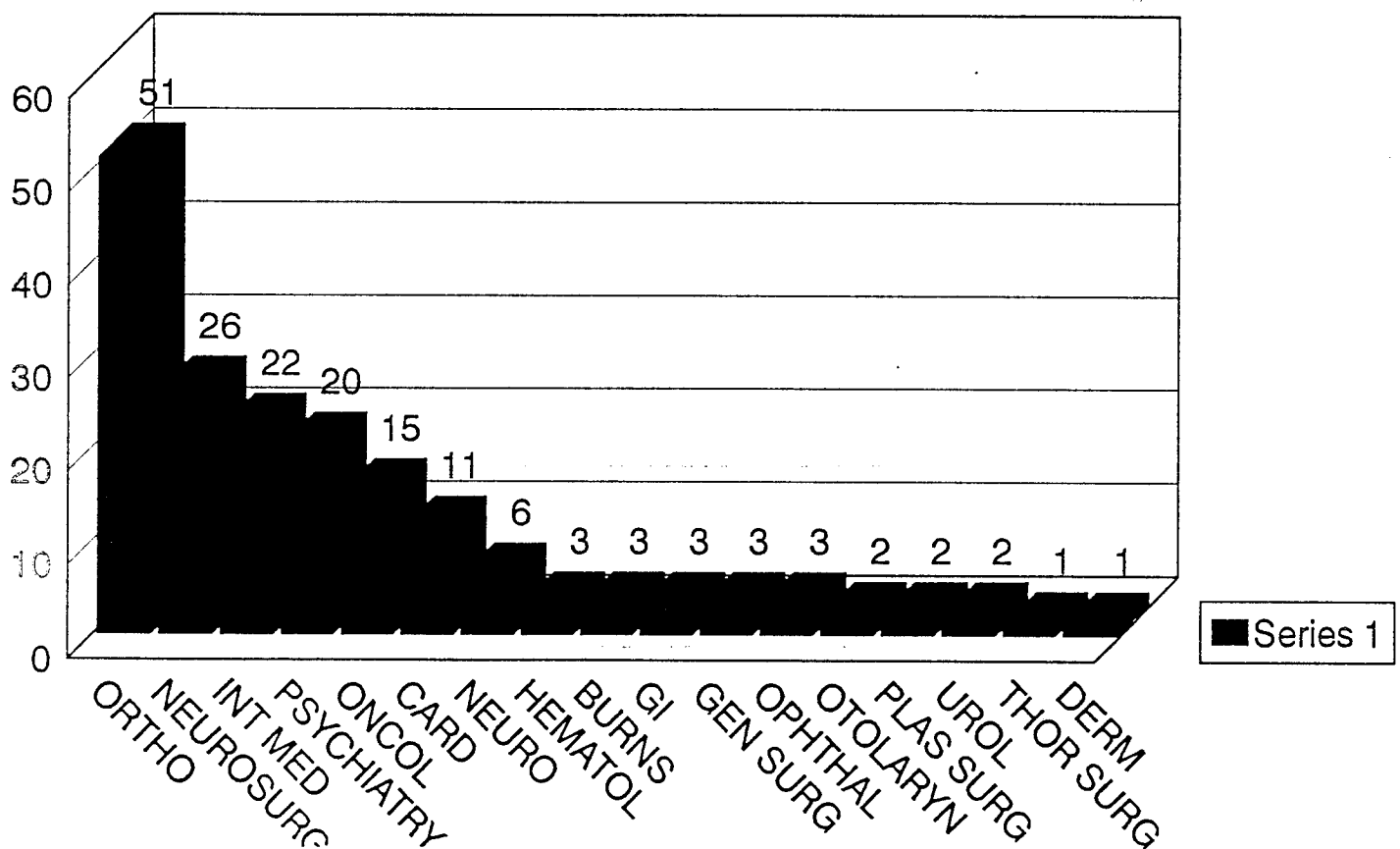
**TABLE 6**

**TOTAL INPATIENT AND AREA DAYS FOR SAMPLE POPULATION**

	<b>MEAN</b>	<b>RANGE</b>
<b>INPT LOS</b>	32.15	0 - 310
<b>TOTAL # OF DAYS IN BAMC AREA</b>	163.61	1 - 526

Figure 4 displays the distribution of patients by assignment to primary clinical service. While some patients were seen and treated by more than one clinical service, this distribution was based on the primary clinical service involved in the patient's case.

## DISTRIBUTION OF MEDICAL HOLD PATIENTS BY CLINICAL SERVICE



## OBJECTIVE TWO: Results of Related Trend Review

Objective Two explored related trends in other DoD and civilian facilities faced with similar problems. The results of the civilian literature review appear in Chapter 1 of this study. The results of surveying other DoD Medical Holding Companies follow.

The surveys of other DoD facilities revealed insightful trends in medical hold models based on similarities and disparities to BAMC's experience. All of the facilities contacted seemed eager to discuss the issues of caring for medical hold patients. The medical holding companies surveyed averaged an assigned strength of 50 to 115 patients while BAMC's average is 87.

An analysis of the geographic origin of medical hold patients imparted important lessons. Like BAMC, the large medical centers, WRAMC, FAMC and WHMC, serve as the regional headquarters for all the smaller medical activities in their respective regions. Additionally, they may also serve as the sole care center for specialized services for their region or even for all of DoD. Consequently, they receive patients from diverse geographic locations. All three large medical centers, like BAMC, found that a majority of their medical hold patients originated from outside their local area; either from the region, other CONUS locations or overseas. This creates enormous problems for the medical holding companies. Like BAMC, these large facilities constantly deal with overcrowded medical holding barracks, family separation issues, shortage of living arrangements for patients awaiting discharge, as well as difficulties in command and control.

In contrast, smaller facilities, such as Womack AMC and Darnall ACH, receive the

majority of their patients from the local area. This difference is critical in understanding how each facility supports its medical hold population. The smaller facilities experienced far fewer problems in housing and family support since the majority of their patients had permanent homes and families in the local area. Additionally, Womack and Darnall do not allow local units with soldiers undergoing medical board processing to transfer these soldiers to the medical holding company (Dillon, 1994 and Thomas 1994). Except in acute medical situations, the parent unit maintains responsibility for the soldier and his family throughout the board process. This policy, combined with the fact that most of these two hospital's patients come from the local area, free up the medical holding company personnel to focus their support on truly displaced patients in need of housing and family support assistance.

All five of the facilities interviewed used similar housing methods for medical hold patients: medical holding barracks, guesthouses and other on-post housing facilities, Fisher Houses (where available) and temporary civilian housing. Additionally, two facilities have developed unique housing options. WRAMC has an agreement with a local hotel to provide lodging for patients at the per diem rate for housing in the WRAMC area (Coppola, 1994). Patients who cannot be housed any other way are authorized off-post lodging and referred to this hotel. At FAMC, the Medical Center Commander serves as the Installation Commander and hence controls all the on-post housing. Senior NCO and officer patients who cannot be placed in the BEQ/BOQ are provided free lodging in the guesthouse (Lang, 1994). Additionally, FAMC's Department of Nursing staffs an "Air Evac Ward". This minimal care ward was initially instituted to serve as an interim (NTE 72 hours) waiting area for patients entering the air evacuation system. This ward now also serves as a holding ward for

displaced medical hold patients for periods up to several weeks. The nursing assets continue to focus on the acute evacuation patients, while the medical hold patients are in a self-care status thereby using only bed spaces and not nursing assets. The advantages for medical hold patients are proximity to hospital facilities such as treatment areas, work assignments and dining facilities, as well as the provision of low cost temporary housing (Lang, 1994). The advantages for the hospitals are reduced staffing costs and increased acute bed availability.

Another focus of the interviews was the availability of assisted living attributes in medical holding barracks such as handicapped access features or medical attendants. None of the five medical facilities had handicapped access features nor did they provide medical or non-medical attendants. Just as in BAMC's situation, this lack of assisted living attributes compounds the problems of housing medical hold patients by limiting barracks access to only completely ambulatory patients. All of the facilities interviewed desired the addition of handicap access features such as elevators, wheelchair ramps, handrails and special bathroom and shower facilities, but cited lack of funds as the exclusionary factor. The spokespersons agreed that providing these features would increase the medical holding barracks access to additional patients currently left on the hospital wards. None of the facilities expressed an interest in placing medical or non-medical attendants in the medical holding barracks. The spokespersons felt that patients requiring an attendant should remain as inpatients.

Each facility was asked whether they had developed any special methodology to assist in reducing the problems of displaced medical hold patients and their families. In addition to the ones already discussed, there are two innovative models in use focusing on lessening the time it takes to process patients through the medical board procedures. About two years ago,

instituted a process action team to tackle the problem which resulted in the development of a new patient care model. The model focuses on completing the soldier's board processing in less than ninety days which allows WRAMC to keep the patient in an attached rather than assigned status (AR 40-3, Para 6-16b). This prevents the soldier from moving his family to the area and allows WRAMC to return local and regional patients to their parent unit during lulls in treatment and board processing (Coppola, 1994). FAMC also dropped their medical hold patient census from over 200 down to an average of 65 by emphasizing quick medical board processing. FAMC focused on the providers role in timely preparation of board matters. For example, medical hold patients needing appointments are given a "within 24 hours" priority (Lang, 1994). Both these models produce direct, positive impacts on patients, families and facilities by reducing the number of patients in medical hold via reduction in medical board processing time.

**OBJECTIVE THREE: Development of Alternatives to the Current BAMC Patient Care Model**

The following is a brief discussion of the seven alternatives developed as possible replacements for the current BAMC patient care model for housing medical hold patients. Note that while the norm is to list "business as usual" as the first alternative, this alternative has been eliminated by the Medical Holding Company Commander who feels that continuing this option is neither feasible for BAMC resourcewise or optimal for the patients.

**Alternative One:** Continue the current policy of keeping displaced medical hold patients as inpatients in BAMC and incorporate a system of alternative care units (ACU),



patients as inpatients in BAMC and incorporate a system of alternative care units (ACU), self-care models or cooperative care models to reduce the resource drain on the facility and increase the independence of the patient prior to disposition.

**Alternative Two:** Provide billeting, which has been upgraded with handicap access features, in the BAMC Troop Command area for these medically handicapped patients who are currently limited to being housed on the inpatient wards. Presently, billeting space in the Troop Command's Medical Holding Company area is used for those medical hold patients who do not need inpatient care, do not require an attendant (assigned or family member) and do not have mobility problems which would require special handicapped access features (elevator, ramps). Exploration of alternative two will require the examination of the need for, and feasibility of, handicapped modifications to the existing barracks through survey of medical facility planners and post engineers.

**Alternative Three:** Provide dedicated or priority housing in other on-post billeting facilities such as the guesthouse, Bachelor Officers' Quarters, Non-Commissioned Officers' Quarters, or family housing. Presently, patients and their family members can arrange housing in the guesthouse and, in some special medical cases, be assigned to family housing. These arrangements are made on a space available basis only. Alternative three would create a "priority" status for these patients and their families in order to obtain on-post housing.

**Alternative Four:** Build a new facility, or acquire and modify an existing post facility, to serve as a hotel for medical hold patients and families. This facility would be specially designed and equipped to accommodate self-care or cooperative care patients and

families. This alternative would be the institution of a separate apartment style facility where patients and their families would live after hospitalization and prior to the patient's final disposition through the MEB/PEB process, or termination of treatment and return to duty.

**Alternative Five:** Place patients in an off-post, civilian guest facility obtained through government contract. Although this option would alleviate the problem of family housing, it would require extensive support in the areas of patient monitoring, command and control, transportation and nutrition care.

**Alternative Six:** Authorize a TDY with per diem status or subsist-out status for medical hold patients and allow them and their family members to obtain their own housing and subsistence for the duration of the treatment. Like Alternative Five, this option would alleviate the problem of family housing, yet would require extensive support in the areas of patient monitoring, command and control, transportation and nutrition care. The TDY option would only be available for a maximum of 179 days, while the subsist-out option would cover stays of 90 days and beyond.

**Alternative Seven:** Implement a combination of the above alternatives into a protocol system in which each soldier's case is evaluated and the best method of housing accordingly selected.

OBJECTIVE FOUR: Determine the Effects of the Alternatives on Patients, Families,

BAMC and Fort Sam Houston

Alternative One: Maintain Displaced Patients on the Acute Care Wards and Implement a  
Self-care, Cooperative Care or Alternative Care Model

Alternative One would maintain the current BAMC patient care model of keeping medical hold patients on the wards as the primary disposition option. This study has its origins in the complaints of staff members who felt that this option was far too costly to BAMC in terms of resource expenditures. They also believed this option to be a poor system for taking care of the patient and his family. Unfortunately, there were no concrete data available to support these complaints. The purpose of this objective was to determine the actual effects of maintaining medical hold patients on the wards at BAMC and then predict the cost savings of instituting a self-care model for medical hold patients.

The first consideration was the impact on the patient and his family. It should go without saying that maintaining a patient on the ward for no other reason than lack of a better place to go is highly undesirable for a number of reasons. First, from the patients perspective, a hospital stay is not most peoples' idea of a vacation. Separation from home, family and normal routine is disruptive. Patients placed in such a scenario may experience negative psychological effects such as isolation, anxiety, confusion and depression or negative physical consequences such as exposure to nosocomial infections. Second, long term patients endure difficulties due to lack of privacy and security of personal belongings, especially in BAMC's open bay wards. This lack of privacy and security can feed the

aforementioned problems of anxiety and depression in addition to being problems in their own right. Third, patients who remain inpatients experience a delay in re-integration to mainstream life. As a result of not quickly transitioning back to an outpatient routine, the patient becomes dependent on the facility and staff to serve as his surrogate home and family. Finally, long inpatient stays can create financial hardships on patients with families. In the case of patients admitted from a distant post, many families relocate to the BAMC area, or travel back and forth, in order to be close to the patient. Over the course of a lengthy hospitalization, the patient and family can literally bankrupt themselves on hotel and other travel expenses.

BAMC also encounters various effects under this alternative. These effects include command and control of patients, differing quality assurance and risk management issues than under other alternatives, and significantly greater resource consumption. In the area of command and control, the maintenance of such long term "boarder" patients may not be compatible with the acute care operations of the medical center. BAMC was not designed as a "hometel" or even as a long term care facility. The presence of fairly healthy, young soldiers may disrupt surrounding ward operations. The quality assurance and risk management issues of this alternative are fully discussed under Objective Five.

The resource consumption incurred by maintaining these patients on the ward was easily the most substantial and negative BAMC effect considered. This effect was defined by determining the actual cost per occupied bed day calculated for each ward. A financial analysis employed Medical Expense and Performance Reporting System (MEPRS) data summarized for BAMC for fiscal year 1993. The result was calculated according to the

following steps.

STEP 1: Determine the number of bed days per ward for FY 1993. This data was extracted from the MEPRS data base and is reflected in Table 7.

TABLE 7  
OCCUPIED BED DAYS FOR FY 93 BY INPATIENT WARD

MON/WARD	SURG (F)	SURG (M)	GYN	THOR SURG	NEUR OSRG	ORTH	ONC OL	ONC OL	CARD IAC	MED 1	MED 2
OCT 92	474	675	387	658	782	974	530	539	728	676	851
NOV 92	473	506	391	502	739	698	471	532	585	512	710
DEC 92	455	624	274	446	656	669	465	503	544	501	794
JAN 93	532	738	310	468	685	927	487	494	604	555	757
FEB 93	412	643	381	468	633	671	457	493	592	563	850
MAR 93	453	733	448	701	767	791	553	603	757	639	771
APR 93	483	622	376	543	651	833	489	501	634	597	658
MAY 93	455	768	282	550	829	919	473	519	583	599	656
JUN 93	469	684	411	342	651	762	342	478	495	480	652
JUL 93	499	681	479	228	654	792	435	479	561	585	606
AUG 93	493	737	564	334	645	832	441	487	625	563	587
SEP 93	476	600	497	336	590	923	444	426	607	466	618
12 MONTH TOTAL	5674	8011	4800	5576	8282	9791	5587	6054	7315	6736	8510

STEP 2: Determine the daily support expenses of each ward. Support expenses include housekeeping, linen and laundry support, utilities, non-medical supplies and logistical support such as biomedical repair. The yearly support costs per ward were divided by the number of occupied bed days per ward for the year. This resulted in the support cost per occupied bed day by ward type as shown in Table 8 below.

TABLE 8

SUPPORT COST PER OCCUPIED BED DAY BY WARD TYPE AT BAMC - FY 93

WARD TYPE	SPT COST PER DAY
MALE MEDICINE	\$60.17
FEMALE MEDICINE	\$53.79
MALE SURGICAL	\$85.82
FEMALE SURGICAL	\$94.19
CARDIAC	\$80.16
GYNECOLOGY	\$89.14
THORACIC SURGERY	\$103.36
NEUROSURGERY	\$72.86
ORTHOPEDICS	\$74.43
ONCOLOGY	\$83.41
ONCOLOGY	\$86.95

STEP 3: Determine the daily nutrition care costs per patient day. The standard MEPRS nutrition care expense for a BAMC inpatient (\$34.96 per day) was added to the support expenses per occupied bed calculated in step 2.

STEP 4: Determine and add direct care personnel costs. Since the study focused on displaced patients who were otherwise eligible for discharge, direct care costs for minimal care patients were used. All pay rates were extracted from the FY 93 Army Composite Standard Rates (message, dated 10 Nov 92) for health care providers. Discussions with nursing personnel revealed that, on average, a minimal care patient consumes two hours per day of an Licensed Vocational Nurse's (LVN) time (medication application and general oversight) and one half hour of a physician's time (rounds and charting). Personnel costs were calculated as shown below and added to the costs determined in steps 2 and 3. The hourly pay includes salary and benefits. The E-4 and O-4 grades were selected as being fairly representative of minimal care staffing.

Nursing personnel costs for an E-4 (LVN) (\$12.29 per hour X 2 hours)	= \$24.59
Physician personnel costs for an O-4 (\$41.22 per hour X 0.5 hours)	= <u>\$20.61</u>
Total direct personnel costs per day	= \$45.20

STEP 5: This step calculated and added in the daily direct expenses obtained from MEPRS data. Daily direct expenses include medical supplies and contract expenses such as nursing support. The yearly direct costs per ward were divided by the number of occupied bed days

per ward for the year. This resulted in the direct cost per occupied bed day by ward type as shown in Table 9 below.

TABLE 9

DIRECT COST PER OCCUPIED BED DAY BY WARD TYPE AT BAMC - FY 93

WARD TYPE	DIRECT COST PER DAY
MALE MEDICINE	\$33.43
FEMALE MEDICINE	\$33.74
MALE SURGICAL	\$27.41
FEMALE SURGICAL	\$24.58
CARDIAC	\$37.42
GYNECOLOGY	\$23.95
THORACIC SURGERY	\$65.35
NEUROSURGERY	\$47.71
ORTHOPEDICS	\$32.61
ONCOLOGY WARD 1	\$51.46
ONCOLOGY WARD 2	\$79.87



STEP 6: The calculations of Steps 1 through 5 yielded the daily maintenance cost of a minimal care patient on the various wards at BAMC (See Table 10). The average daily cost was calculated at \$200.11 per patient. This daily cost includes only those expenses directly attributable to an inpatient stay. Ancillary costs were not included since these services (X-ray, pharmacy and lab) would be received by the patient in an outpatient status as well. This MEPRS calculation was meant to determine only what BAMC would actually save by removing these patients from the inpatient setting.

FINAL RESULT: Determination of possible savings due to implementation of the self-care model for medical hold patients. According to civilian studies, the implementation of self-care on an alternative care ward can generate cost savings of 47% over regular nursing care on an acute care ward (Murray-Leslie, et al, 1991). This savings percentage was applied to the average ward costs per occupied bed day shown in Table 10 to produce the new daily cost per occupied bed day in Table 11. The average daily cost under the self-care model was calculated at \$106.05 per patient. The savings between normal ward costs versus self-care ward costs is \$94.05 per occupied bed day across BAMC.

TABLE 10

COST PER OCCUPIED BED DAY BY WARD TYPE AT BAMC - FY 93

WARD TYPE	COST PER DAY
MALE MEDICINE	\$173.76
FEMALE MEDICINE	\$167.69
MALE SURGICAL	\$193.39
FEMALE SURGICAL	\$198.94
CARDIAC	\$175.33
GYNECOLOGY	\$193.25
THORACIC SURGERY	\$248.84
NEUROSURGERY	\$200.73
ORTHOPEDICS	\$187.20
ONCOLOGY WARD 1	\$215.03
ONCOLOGY WARD 2	\$246.98
AVERAGE WARD COST	\$200.11

TABLE 11

COST PER OCCUPIED BED DAY BY WARD TYPE AT BAMC - FY 93  
UNDER THE SELF-CARE MODEL OF PATIENT CARE

WARD TYPE	COST PER DAY
MALE MEDICINE	\$92.09
FEMALE MEDICINE	\$88.88
MALE SURGICAL	\$102.49
FEMALE SURGICAL	\$105.44
CARDIAC	\$92.92
GYNECOLOGY	\$102.42
THORACIC SURGERY	\$131.86
NEUROSURGERY	\$106.39
ORTHOPEDICS	\$99.22
ONCOLOGY WARD 1	\$113.97
ONCOLOGY WARD 2	\$130.89
AVERAGE WARD COST	\$106.05

The measurable effects of Alternative One on Fort Sam Houston are minimal since, in the eyes of the post, it is practically business as usual. The largest impact is the continued housing of visiting family members.

#### Alternative Two: Upgrade the Medical Holding Company Barracks

In order to comprehend a discussion of the effects of upgrading the medical holding barracks, a review of why the facility upgrades are necessary is essential.

Unfortunately, the current barracks facility is not suited for all medical hold patients who are ready for discharge from an inpatient ward to an outpatient status. Lack of handicap access features limits the type and number of patients who can transition to the medical holding barracks. The limitations were discovered first hand by conducting a barracks walk-through led by a current resident who is a lower extremity amputee. The problems begin with access to the building itself. Although medical hold patients are assigned rooms on the first floor, the first floor is not flush with ground level. Patients must ascend a set of stairs which constitute a five foot rise from ground level and there are no wheelchair ramps or lifts to assist in this effort. An elevator is located at one end of the building, but because of long standing mechanical problems, has been condemned and is not available for use. Once up the stairs, a set of two heavy doors must be negotiated. These doors are heavy and constitute a problem for patients with strength or balance problems (common among amputees or patients whose condition has caused a decline in motor skills). Recall that 45.8% of patients assigned to the Medical Holding Company are there for orthopedic or neurosurgical problems.

Serious access and safety issues exist in the latrine facilities. The latrine door is heavy and opens by turning a door knob which is more difficult to negotiate than a lighter push door. The interior corridors are narrow and leave little room for maneuvering a wheelchair. None of the toilet stalls are wheelchair accessible. None of the toilet stalls contain handrails to assist with balance or leverage. One sink has been lowered for wheelchair patient use however the accompanying mirror was not lowered. Wet tile floors become slick and constitute a slippery hazard for patients on rubber-tipped crutches. The amputee patient reported falling at least once. There are no bathtubs; showers being the only option. The showers have a 5 inch lip barring wheelchair access and no interior handrails. Until recently, the shower stalls had no seat. The purchase of a small plastic chair has helped the situation, however a permanently installed, fold-down seat would be optimal.

The feasibility of upgrading the barracks to increase access was explored through discussion with the garrison design engineers and architect. Surprisingly, the necessary upgrades are not prohibitively expensive. The architect provided rough estimates for the renovations as outlined below.

- add wheelchair lift to outside of building - \$3,000.00 to \$4,000.00
- modify doors with electric automatic openers - \$350.00 each
- expand one toilet stall to wheelchair width and add handrails - \$500.00
- lower mirror to match lowered sink - no cost (the Medical Holding Company staff can accomplish this modification at no cost through the post's self help store).
- add a bathtub - \$500.00 to \$600.00

-- install fold down seat and rails in shower stalls - \$200.00 each

These estimates bring the cost of renovating the barracks to approximately \$6550.00 (Haggan, 1994). The cost of repairing the broken elevator and fixing the slippery latrine floor were not yet available from the installation Department of Public Works at the time this study was concluded, and hence, were not included in the above estimates. The Medical Holding Company commander is still pursuing these repair issues.

Even given the lack of modifications previously discussed and while obviously not suited for officers, senior non-commissioned officers, or patients with accompanying family members, the medical holding company barracks is the ideal disposition option for junior enlisted (E6 and below) single soldiers. The barracks is proximally located to a number of medical and administrative facilities needed by the patients. The troop dining facility is adjacent and Beach Pavilion, which contains the majority of BAMC's medical assets, is less than three blocks away. Additionally, the Medical Holding Company offices are collocated with the barracks. This allows proximity for administration and command and control oversight. For single medical hold patients, in the grade of E-6 and below, a population segment amounting to 63.1% of the medical hold patient population in this study, the upgraded barracks alternative is a winning option.

The consequences for BAMC are both negative and positive. The short term negative impact of upgrading the medical hold barracks would be financial since BAMC is currently in the midst of a funding crisis. Realistically, such an unforecasted expenditure would not be likely for this fiscal year unless part of the financing role were assumed by the installation. (The post owns the building, not BAMC.) On a positive note, such an upgrade

would be one of the most substantial reliefs in getting medical hold patients off the wards at BAMC, since many of the displaced patients currently consist of medically handicapped junior enlisted grade soldiers otherwise eligible for barracks housing.

The ramifications for Fort Sam Houston involve funding and executing such a barracks upgrade. Funds for post renovations are limited. Since post owns the building, a funding compromise could be coordinated between the installation and BAMC. The post designers must also work within the limitations of the guidelines for renovating historical buildings. Finally, the BAMC Troop Command is scheduled to relocate from this building (2791) to others (2264 and 2265) in 1999 (Tolman, 1994). The post engineers must weigh the advantages and disadvantages of renovating a structure for a population which will possibly vacate it in less than five years.

#### Alternative Three: Provide Dedicated Housing On-Post

For patients with a family, this is one of the best alternatives. The ability to easily gain on-post quarters would alleviate many problems patients with families experience under the current system, such as maintaining two households (one near BAMC and one at their post of origin) or hotel expenses. Furthermore, patients can be discharged home for convalescent leave once the provider is satisfied the patient has a stable home and family to be discharged to, an option that would become more viable if dedicated housing near BAMC was available. Dedicated on-post housing would significantly help eliminate the physical separation of patient and family, alleviate the stress and side effects of being an inpatient, and enable patients to transition to outpatient life much sooner. The major drawback for the

patient and his family is the hardship of undergoing a permanent change of station (PCS) for what usually turns out to be less than a one year stay on Fort Sam Houston, resulting in two PCs moves in under twelve months.

Even if there were not an increasing housing shortage on Fort Sam Houston, the majority of medical hold patients are not eligible for quarters based on two criteria (Marin, 1994). First, patients are only eligible for housing when they are in an assigned or "attached for quarters" status. Patients who arrive in a TDY status, or whose attachment orders do not state "attached for quarters" are not authorized permanent housing. Second, patients who are not expected to be assigned to Fort Sam Houston for at least one year are not placed on the housing list, but are immediately issued a non-availability statement instead. In some extreme medical cases, an exception to policy can be tendered through the medical center and post headquarters for housing. Approvals for these exceptions are rare and in any event do not result in immediate on-post housing, only priority status on the waiting list. Thus, the vast majority of medical holding patients automatically find themselves looking for off-post lodging. The post housing office will assist in the search for short term housing. Apartments available on short term leases, (by the week or by the month) range from \$389 up to \$800 per month with furnishings (Marin, 1994).

The consequences of priority housing for BAMC would be positive in that more patients could leave the ward to convalesce at home if that home was in the local BAMC area. Furthermore, the burden on the Medical Holding Company staff and social work staff would be eased by such a family oriented alternative. The drain on BAMC's financial and personnel resources would be significantly and positively affected. Beds and staffing would



be freed up to care for more acute patients, which in turn, saves BAMC money in the long run by reducing CHAMPUS expenditures.

Priority housing for medical hold patients would impose burdensome consequences on the installation and interviews with installation housing officials exposed the improbability of a priority housing option. The implementation of this option would require a large increase in the number of family housing units or changes in the current housing eligibility rules. According to Fort Sam Houston housing officials, housing shortages, long waiting lists exceeding (in some cases) three years, and eligibility rules prohibit such a move (Marin, 1994). This situation is compounded by the steady decrease in the amount of available family housing units on Fort Sam Houston due to renovation and destruction of outdated quarters. The number of enlisted family housing units on Fort Sam Houston will decrease by over 250 units in the next few years. Setting aside housing for a group of patients and family members who normally arrive, reside and exit the Fort Sam Houston area in under a year would prove highly inefficient and unwieldy to manage. The impact would also be keenly felt by permanent party families assigned for a normal three year tour who are denied housing due to a "medical hold housing set aside".

#### Alternative Four: Construct or Acquire A Medical Holding Company Hotel

Alternative four is an adaptation of a civilian care model under which hospitals purchase or construct proximal hotel facilities for their patients. From a patient and family perspective, this is a highly desirable option. Like BAMC's Fisher House, (the military equivalent to the Ronald McDonald Houses for families of long term patients) such a facility

would allow the families to be united in a low or no cost homelike setting, reducing long, hardship separations. This option would also relieve the soldier from financial burdens such as trying to maintain two households or commute between BAMC and their permanent home.

From BAMC's standpoint, this choice would help relieve the pressure to move patients out of high cost acute care settings, reduce lengths of stay and assist in the patients' recovery by uniting patient and family. The consequences of a patient hotel would, like priority housing, be positive in that more patients could leave the ward to convalesce at home if that home was in the local BAMC area. Furthermore, the burden on the Medical Holding Company staff and social work staff would be eased by such a family oriented alternative. The drain on BAMC's financial and personnel resources would be significantly and positively affected. Beds and staffing would be freed up to care for more acute patients, which in turn, saves BAMC money in the long run by reducing CHAMPUS expenditures. From a negative resource aspect, the cost of constructing and maintaining such a facility would be of paramount concern. To elucidate the costs involved, a general description of the facility and its concomitant expenses were calculated (see Appendix 4). The estimated building, furnishing and maintenance cost of such a facility would run between \$497,000 and \$523,000.

The institution of alternative four would both positively and negatively impact Fort Sam Houston. Positively, additional transient spaces would assist the installation in meeting transient housing demand. However, the expansion of spaces would exact additional staffing and oversight resources from the installation budget which is already severely strained and decreasing in size.

#### Alternative Five: Contract With an Off-Post Hotel for Lodging

Contracting with off-post hotels or motels is an option currently in use at Fort Sam Houston for student personnel at the United States Army Medical Center and School (AMEDDC&S). The AMEDDC&S contacts the post housing division and requests rooms for a particular course. If the housing division is unable to provide rooms, the AMEDDC&S then contacts post contracting to procure off-post rooms at a reduced price. Once the student stay at the contracted lodging is completed, the bills are sent to the housing division's Unaccompanied Personnel Branch (UPB) for payment. The UPB pays the bill with funds that have been transferred to it from the AMEDDC&S. The underlying principle is that negotiating and contracting for bulk quantities of hotel rooms is cheaper due to available economies of scale, therefore saving the government and the patient greater expense.

Such an approach would benefit medical hold patients and families. Patients could be directed to a hotel and be spared the hassle and uncertainty of calling or driving throughout the area searching for a room. The patient would also be spared the out of pocket expense of paying the bill directly and claiming the voucher later.

The impact on BAMC of shifting medical hold patients to contract hotel rooms would be overall positive. BAMC's contracting personnel would become involved with this issue in the form of coordinating between the Medical Holding Company staff and the installation contracting office. Even if BAMC had to fund the hotel room contract, this expense would be far less than the cost of maintaining medical hold patients on the acute care wards after they are eligible for discharge. Beds and staffing would be freed up to care for more acute patients, which in turn, saves BAMC money in the long run by reducing CHAMPUS

expenditures.

Contracting hotel rooms for medical hold patients would impact upon the installation contracting office. The impact should be minimal however, since installation contracting is already contracting rooms for the AMEDDC&S. Additionally, room contracting for medical hold patients would reduce the demand for transient housing which is perennially in short supply on Fort Sam Houston.

#### Alternative Six: Authorize Per Diem or Subsist-Out Status

This alternative would authorize per diem or subsist-out status for medical hold patients and their families. Per diem is authorized in cases of Temporary Duty (TDY). Subsist-out status, which equates to having Basic Allowance for Quarters (BAQ) and Basic Allowance for Subsistence (BAS), is used in cases of assignment or attachment to Fort Sam Houston. According to an interview with the Health Services Command patient travel and reimbursement expert, the provisions for this alternative are already in place and in use throughout DoD (Trumbla, 1994). The Joint Federal Travel Regulation (JFTR) governs the movement and eligibility for funding of patients and family members in both the TDY and subsist-out status.

For many patients, especially officers and senior NCO's, this is the option of choice. Patients from outside the local area normally arrive at BAMC in a Temporary Duty (TDY) status which covers funding for travel, housing and subsistence. When a patient is sent TDY to BAMC for outpatient services, the TDY is funded by the patient's parent unit. When the patients arrives TDY for inpatient services, Health Services Command, through the Medical

Open Allotment (MOA) accounts, funds the TDY expenses. Since the patient's parent unit funds outpatient TDY expenses, the total amount spent for BAMC medical hold patients who arrived TDY in an outpatient status is unknown. For inpatients, BAMC's region spent approximately \$400,000 from the Medical Open Allotment accounts for inpatient and family travel and expenses in FY 93 (Trumbla, 1994).

After arrival and initial evaluation, the physician may determine that the patient must undergo long term treatment, rehabilitation or the MEB process. At this juncture, the patient is removed from TDY status and attached to the Medical Holding Company. Once a patient has been attached to the medical holding company for 90 days, he will be assigned to the unit. In either the attached or assigned status, the patient is expected to subsist outside the medical center on his normal pay and allowances.

While in a TDY status or temporarily duty assignment, a patient may reside in post transient billets. There are two problems with this strategy. First, despite there being over 750 transient spaces on post, and an additional 110 rooms in the Guesthouse, there is often a waiting list for transient housing. Post policy therefore limits guests to stays of 10 to 14 days in the transient quarters and 30 days in the guesthouse. After this period, medical hold patients are asked to find temporary lodging elsewhere at their own expense. The second issue with transient billeting is the expense. Nightly stays in transient housing cost \$23.50 while the guesthouse charges range from \$22.00 to \$26.00 per night. Such expenses would be prohibitive for most patients who expect to be in the BAMC area for several months; especially recalling that the majority of patients are in the grade of E-6 and below.

### Alternative Seven: Develop Algorithm to Evaluate Each Case

Evaluating each patient's case and developing an individual solution is understandably an excellent alternative from the patient's perspective. The patient's entire environment and influencing factors would be illuminated and considered before developing a solution. This approach closely mirrors the model used by medical providers in developing and implementing a patient's medical care plan. This is also one of the best alternatives from a family's viewpoint. While most of the previous alternatives take into consideration the presence of family members with the medical hold patients, these alternatives do not take into consideration the individual housing needs of the family. All of these families have varying situations and needs and thus, they will not all necessarily fit into only one or two alternatives. An algorithm approach will consider the individual housing needs of the family and ensure a tailored housing solution from among a number of alternatives.

Developing an algorithm for evaluating and dispositioning each new medical hold patient would include a number of mainly in-house costs for BAMC. A Process Action Team (PAT) or committee could be formed to certify and implement the algorithm developed and presented in Objective Seven of this study. Costs would include the manhours expended to certify the algorithm, educate the staff, conduct additional research in some areas, collect data and document the results of the algorithm. The benefits for BAMC could include saving inpatient resources, increasing access by freeing up beds, and assisting the Medical Holding Company and social work staffs in aiding medical hold patients and families.

The algorithm implications for post would be minimal and predominantly positive. Expanded disposition options and an algorithm should spread medical hold patients and

family members evenly throughout the post housing systems.

OBJECTIVE FIVE: Determining Quality Assurance and Risk Management Issues for each

Alternative

To evaluate the quality assurance (QA) and risk management (RM) issues concomitant with the alternatives, a roundtable discussion was held with the BAMC program coordinators for quality assurance and risk management. The QA and RM aspects, centered in patient and hospital based areas, were analyzed for each alternative.

Alternative One: Maintain Displaced Patients on the Acute Care Wards and Implement a

Self-care, Cooperative Care, or Alternative Care Model

Alternative one (maintaining displaced patients on the acute care wards due to a lack of disposition options and implementing self-care or alternative care ward) raised the most discussion. The group agreed that if a patient had a bona fide medical need to remain an inpatient, than alternative one was the best option. However, since the study focused on patients who did not necessarily have medical reasons for staying on the wards, the group discussion focused on these displaced patients. Keeping a patient on the ward does not necessarily represent high quality care and in some cases might actually incur risk to both the patient and the facility. In these cases, the group consensus was that alternative one was the poorest option for a number of reasons.

The opposition to alternative one fell into two categories: patient and hospital based

concerns. The patient concerns centered on the psychological effects of long term hospitalization. Patients who are otherwise healthy enough for discharge, may tend to develop negative feelings toward being hospitalized for what they perceive is "no good reason". These negative emotions could take the form of depression, anger or confusion. The lack of privacy, lack of security for belongings, exposure to nosocomial infections and sense of disconnectedness to a unit and family would propagate this outlook. Eventually, this negative outlook could manifest in behavioral problems on the ward, resulting in poor outcomes for both the patient and the staff. Remaining on the ward also delays the patient's adjustment to his new health state by fostering a false sense of dependence on the facility and staff.

The hospital concerns centered on exposing the hospital to the needless liability incurred when a patient is kept as an inpatient for non-medical reasons. The QA manager noted that non-active duty patients in DOD facilities and patients in all civilian facilities are discharged as soon as possible partly to decrease such liability. At BAMC, the problem is compounded by the fact that these predominantly ambulatory patients actually spend a great deal of time away from ward supervision. These patients tend to roam the facility, and are often allowed to sign out on pass for extended periods of time. This liberal pass policy presents serious risk management possibilities for the facility since BAMC is responsible for these absent inpatients in the same manner as an inpatient in an actual hospital bed. A negative event or outcome for a patient on pass could put the facility in a severely compromised position.



### Alternative Two: Upgrade the Medical Holding Company Barracks

Alternative two was viewed as one of the superior options for single, ambulatory soldiers. As opposed to remaining on the ward, a patient in the medical holding barracks has a better sense of security and connectedness to a unit. These patients can begin the process of learning to live and function outside a hospital setting, thereby accelerating their sense of independence. Unlike total separation from military structure (see discussion of alternatives three through six beginning on page 63), these patients still benefit from military supervision from Medical Holding Company staff co-located with the barracks. Additionally, the medical facility is relieved from the liability of oversight. On the downside, these patients are expected to provide their own care in an largely unsupervised setting. Such an expectation of self-care may not be suitable for all patients.

### Alternative Three: Provide Dedicated Housing On-Post/Alternative Four: Construct or Acquire A Medical Holding Company Hotel/ Alternative Five: Contract With an Off-Post Hotel for Lodging and Alternative Six: Authorize Per Diem or Subsist-Out Status

Alternatives three, four, five and six represent complete separation from the medical facility and the company. The QA and RM coordinators felt that as long as the patient's discharge to one of these settings was medically appropriate, there were no QA or RM issues since the patients were outside the medical facility.

### Alternative Seven: Develop an Algorithm to Evaluate Each Case

Alternative seven was selected as the most preferable alternative in light of patient

and hospital needs. The coordinators agreed that such a system best represented the current successful trends of case management and discharge planning in the civilian setting. Such a case by case approach would be the optimal strategy for insuring quality and managing risk since each patient's case would be carefully tailored by a team of medical and social experts to best fit the patient's situation.

#### OBJECTIVE SIX: Criteria Development and Decision Model

A criteria set was developed in order to rate and rank order each alternative. The set of criteria was developed through interviews with subject matter experts. Next, an expert panel was asked to weight the criteria in as objective a manner as possible through a survey instrument. The list of the expert panel members and the survey instrument are shown in Appendixes 2 and 3, respectively. The survey rating scale used was a five-point, bipolar adjective scale anchored at the points.

#### Results of the Expert Panel Criteria Weighting

The purpose of the expert panel survey was to objectively weight the criteria for use in the decision model. A pilot survey was run with two volunteer panel members to test and refine the survey instrument before distribution to the rest of the panel members. The response rate to the final panel survey was excellent with thirteen of fourteen members responding for a response rate of 93%.

The panel members were queried as to how important the following criteria (in order of survey presentation) would be in developing a new patient care model for medical hold

patients. The panel members rated the importance of the criteria on a scale of "not important" to "extremely important".

#### SURVEY CRITERIA

1. Financial Cost to BAMC
2. Financial Cost to FSH
3. Financial Cost to the Patients and his Family
4. Patient's Convenience
5. Command and Control of Patients
6. Quality of Care
7. Risk Management Aspect
8. Ability of Patient Transport System to Handle the Patient Load
9. Availability of Local Civilian Lodging
10. Availability of On-Post Lodging
11. Impact on On-Post Lodging
12. Impact on Inpatient Nursing Staff
13. Impact on Available Beds at BAMC
14. Preference of the Attending Physician

#### Judge Model Methodology

The weighted criteria were then incorporated into a Judge Model of decision making

to select the best alternative. All panel scores for each particular criteria were added and then divided by fourteen to get the average score for that criteria. Next, these average criteria ratings were recoded into numeric equivalents as shown.

<u>ADJECTIVE</u>	<u>SCALE</u>	<u>RECODE AS:</u>
Not Important	1	-2
Slightly Important	2	-1
Somewhat Important	3	0
Very Important	4	+1
Extremely Important	5	+2

Once the criteria were recoded, they were added up to get the overall coded rating of 13.76. This overall coded rating was divided into 100% to obtain the scaling factor of 7.27.

This scaling factor was then applied to each criteria to achieve the final rescaled rating. Tabulation revealed the weighted criteria adjusted for the scaling factor. At this point, it was possible to view the criteria in order of importance as ranked by the panel members. The criteria, adjusted for panel weighting, are listed in Table 12 in order of importance.

These recoded criteria were introduced into the Judge Model. (See Tables 13 and 14 for complete Judge Model work sheet. The criteria in Tables 13 and 14 are presented in the same order as they appeared in the survey instrument.) Each of the seven alternatives were rated based on interviews with subject matter experts or other objective methods (see

discussion of each objective). These results are shown in Table 13. Next, the alternative ratings were considered against the weighted criteria to produce an indication of the best alternative. See Table 14 for these results.

Two criteria, patient cost and patient convenience, were each considered based on two sub-categories: patients without family members and patients with family members. Since variances in family situations impact on rating the criteria of patient cost and convenience, splitting the categories allowed independent consideration. These subcategories are depicted by split rows in Tables 13 and 14. The first number is for patients without family members and the second number is for patients with family members.

Based on the weighted criteria and the input of subject matter experts, the Judge Model identified Alternative 7 (algorithm) as the best alternative under both conditions (patients with and without family members).

TABLE 12  
CRITERIA WEIGHT VALUES

<b>RANK</b>	<b>CRITERIA</b>	<b>PANEL WEIGHT</b>
1	Quality of Care	13.96
2	Cost to BAMC	11.05
3	Impact on Nursing	10.91
4	Impact on Available Beds	10.54
5	Availability of On-Post Housing	10.03
6	Cost to the Patient	7.63
7	Risk Management	7.42
8	Impact on On-Post Housing	7.05
9	Command and Control	3.99
10	Cost to Fort Sam Houston (Tie)	3.64
11	Patient Convenience (Tie)	3.64
12	Sufficiency of Patient Transport System	3.56
13	Availability of Off-Post Housing	3.42
14	Physician Preference	3.19

TABLE 13  
JUDGE MODEL RESULTS - ALTERNATIVE RANKING

CRITERIA	SURVEY RATING	CODED RATING	RESCALE RATING	A 1	A 2	A 3	A 4	A 5	A 6	A7
BAMC COST	4.57	1.52	11.05	0	.2	.4	0	.1	.1	.2
FSH COST	3.50	0.50	3.64	.3	.2	0	0	.3	.1	.1
PT COST	4.21	1.05	7.63	.1/0	.2/0	.2/.2	.2/.4	.1/.2	.1/.1	.1/.1
PT CONV	3.50	0.50	3.64	0/0	.2/0	.2/.1	.2/.3	0/.1	0/.1	.4/.4
CMD/CONT	3.86	0.55	3.99	.1	.3	.1	.3	0	0	.2
QUALITY	4.79	1.92	13.96	0	.2	.1	.1	.1	.1	.4
RISK MGT	4.07	1.02	7.42	0	.2	.1	.1	.1	.1	.4
TRANS SYS	3.43	0.49	3.56	.1	.1	.15	.1	.2	.2	.15
AVAIL OFF POST HSG	3.29	0.47	3.42	0	0	.2	0	.3	.3	.2
AVAIL ON POST HSG	4.14	1.38	10.03	.1	.1	0	.2	.2	.2	.2
IMPACT ON POST HSG	3.86	0.97	7.05	.1	.2	0	.2	.2	.1	.2
NURSING IMPACT	4.50	1.50	10.91	0	.167	.167	.167	.167	.167	.17
BED IMPACT	4.36	1.45	10.54	0	.167	.167	.167	.167	.167	.17
PHYS PREF	3.07	0.44	3.19	0	.1	.1	.1	.1	.1	.5

TABLE 14  
JUDGE MODEL - WEIGHTED COMPONENT

CRITERIA	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT 7
BAMC COST	0	2.21	4.42	0	1.11	1.11	2.21
FSH COST	1.09	0.73	0	0	1.09	0.36	0.36
PT COST	0.76/0	1.52/0	1.52/1.52	1.52/3.05	0.76/1.52	1.52/1.52	1.52/1.52
PT CONV	0/0	0.73/0	0.73/0.36	0.73/1.09	0/0.36	0/0.36	1.46/1.46
CMD/CONT	0.39	1.19	0.39	1.19	0	0	0.80
QUALITY	0	2.79	1.39	1.39	1.39	1.39	5.58
RISK MGT	0	1.48	0.74	0.74	0.74	0.74	2.97
TRANS SYS	0.36	0.36	0.53	0.36	0.71	0.71	0.53
AVAIL OFF POST HSG	0	0	0.68	0	1.07	1.07	0.68
AVAIL ON POST HSG	1.0	1.0	0	2.01	2.01	2.01	2.01
IMPACT ON POST HSG	0.71	1.41	0	1.41	1.41	0.71	1.41
NRSG IMPACT	0	1.82	1.82	1.82	1.82	1.82	1.82
BED IMPACT	0	1.76	1.76	1.76	1.76	1.76	1.76
PYHS PREF	0	0.32	0.32	0.32	0.32	0.32	1.60
TOTALw/o fam w/family	4.31 3.55	17.32 15.07	14.30 13.94	13.25 15.14	14.19 15.31	13.52 13.88	24.71 24.71



The Judge Model sorted the alternatives into rankings based on the weighted criteria and the presence or absence of family members. The results are shown below. The number following each alternative is the number of the alternative.

### ALTERNATIVE RANKINGS

#### PATIENTS WITHOUT FAMILY

1. Algorithm (Alt #7)
2. Upgraded Barracks (Alt #2)
3. Priority Housing (Alt #3)
4. Off-Post Contract Hotel (Alt #5)
5. TDY/Subsist-out (Alt #6)
6. Medical Holding Co Hotel (Alt #4)
7. Leave on Wards (Alt #1)

#### PATIENTS WITH FAMILY

1. Algorithm (Alt #7)
2. Medical Holding Co Hotel (Alt #4)
3. Off-Post Contract Hotel (Alt #5)
4. Upgraded Barracks (Alt #2)
5. Priority Housing (Alt #3)
6. TDY/Subsist-out (Alt #6)
7. Leave on Wards (Alt #1)

An individual or case managed approach to the problem emerges as the best solution in either case (with or without family members present). Leaving patients on the ward, even with the institution of self-care, cooperative care or alternative care ward, surfaces as the least favorable option in either circumstance.

#### OBJECTIVE SEVEN: Develop a System to Efficiently Channel Patients into the Most Suitable Housing Through the use of an Appropriate Patient Care Model.

The primary goal of any patient care model is providing quality health care (Wiesel and Michelson, 1986). This means the patient's situation should be promptly, accurately and completely analyzed to insure the patient receives appropriate service. In other words, the patient should receive the specific care or assistance necessary for his situation in a timely manner. In any case, inappropriate care or services, will result in unnecessary risk, aggravation and expense.

Algorithms or protocols have long been employed in the healthcare sector to assist

providers in rapidly and consistently analyzing patient needs and providing the appropriate services (Wiesel and Michelson, 1986). Any algorithm should be capable of universal application to all types of patients and should present an unbiased picture to the medical or administrative staff. An algorithm created to assist the Medical Holding Company staff place patients in appropriate housing has four goals. The first goal is to ensure the proximity of patient housing to BAMC, thereby creating a situation conducive to the patient's ability to receive quality health care. The second goal is ensuring provision of housing that meets the patient's financial and personal needs. The third goal is to promote the rapid return of the patient to maximum function at the earliest opportunity. Finally, the fourth goal is to create a program which will enhance cost containment for BAMC. Meeting the first three goals, housing proximal to care, housing appropriate for patient needs and rapid return to maximum function, will go a long way to achieving the fourth. When each patient's health care is carefully monitored to ensure proper assessment and services, with his return to duty planned at the earliest opportunity, all of the cost components will reflect savings.

An algorithm to assist the Medical Holding Company staff meet these four goals has been created in this graduate study (see Figure 5). Before presenting the algorithm, it is imperative to discuss the assumptions incorporated into its design.

The most important assumption was that BAMC would be successful in expanding some of the housing alternatives. These expanded options are:

- an upgraded medical holding barracks complete with handicap access features,
- the current 30-day occupancy limit on transient housing is increased to 90-days for medical holding patients,
- BOQ/BEQ status (as opposed to VOQ/VEQ) is reinstated for medical hold patients who are expected to remain in the BAMC area for over 90 days,
- a step-down or alternative care ward is implemented at BAMC for patients requiring little or no nursing care,
- the contract hotel option is made available,
- Fort Sam Houston housing has handicapped permanent quarters available.

The second assumption was that BAMC would be required to implement 90-day

medical board processing limit.

The third assumption was that due to its expense and futuristic nature, the Medical Holding Company hotel was not appropriate to include in the algorithm as an option.

The fourth assumption is that a patient completing his association with the Medical Holding Company may exit the algorithm at any point.

Finally, it is assumed that at any point in the patient's treatment, the provider, social worker, company commander and patient can jointly decide that the patient (and family if applicable) will execute a PCS move to Fort Sam Houston. In this situation, an exception to policy would be pursued by the company commander to obtain on-post quarters if a family is involved. Typically, this situation involves a patient who will remain an inpatient; however, cases have also occurred wherein the patient was made an outpatient as well. The needs of the patient are the bottom line of this situation.

In the case of a single soldier, who will remain an inpatient, the PCS is simply a paper drill to lower expenses for all concerned (several of the recently arrived 82d Airborne Division soldiers were handled in precisely this manner).

It should be noted, that "provider-mandated" PCS situations are relatively rare and are done primarily for the benefit of the patient. This algorithm supporting assumption is based on how similar cases are currently processed.

In the case of a single soldier, who will be placed in an outpatient status, the soldier would simply be provided transient housing, without an exception being required, until permanent, off-post housing could be arranged.

In all the above cases, rank and family size information would be appropriately used to acquire the correct type of housing.

The algorithm appears on the next seven pages as Figure 5.

## HOUSING DISPOSITION ALGORITHM

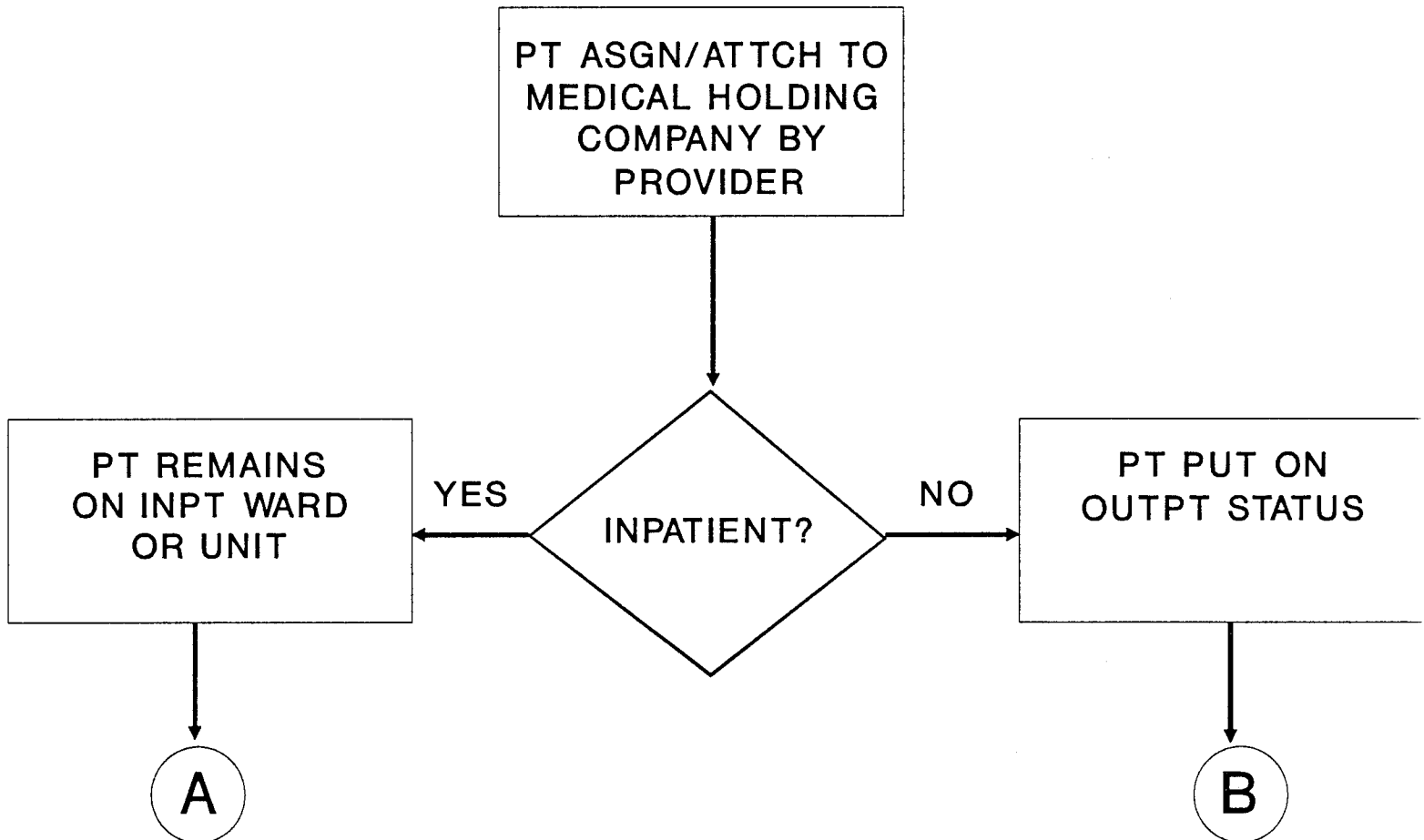


Figure 5-a. Housing Disposition Algorithm - Start point; patient assigned or attached to the Medical Holding Company by his provider.

## INPATIENT ALGORITHM

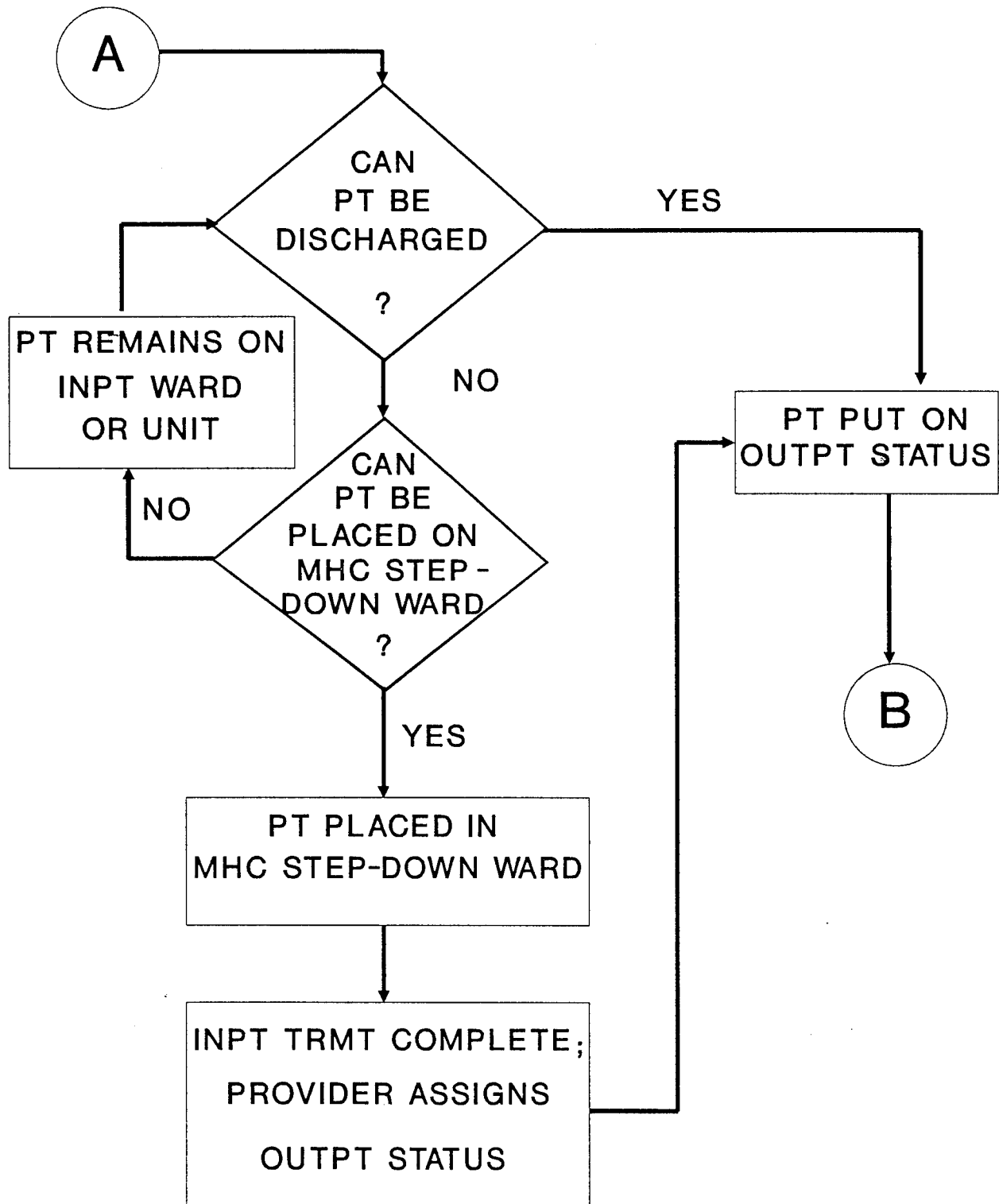


Figure 5-b. Housing Disposition Algorithm - Inpatient Assessment; delineates continuous inpatient assessment cycle.

## OUTPATIENT ALGORITHM

### PART 1

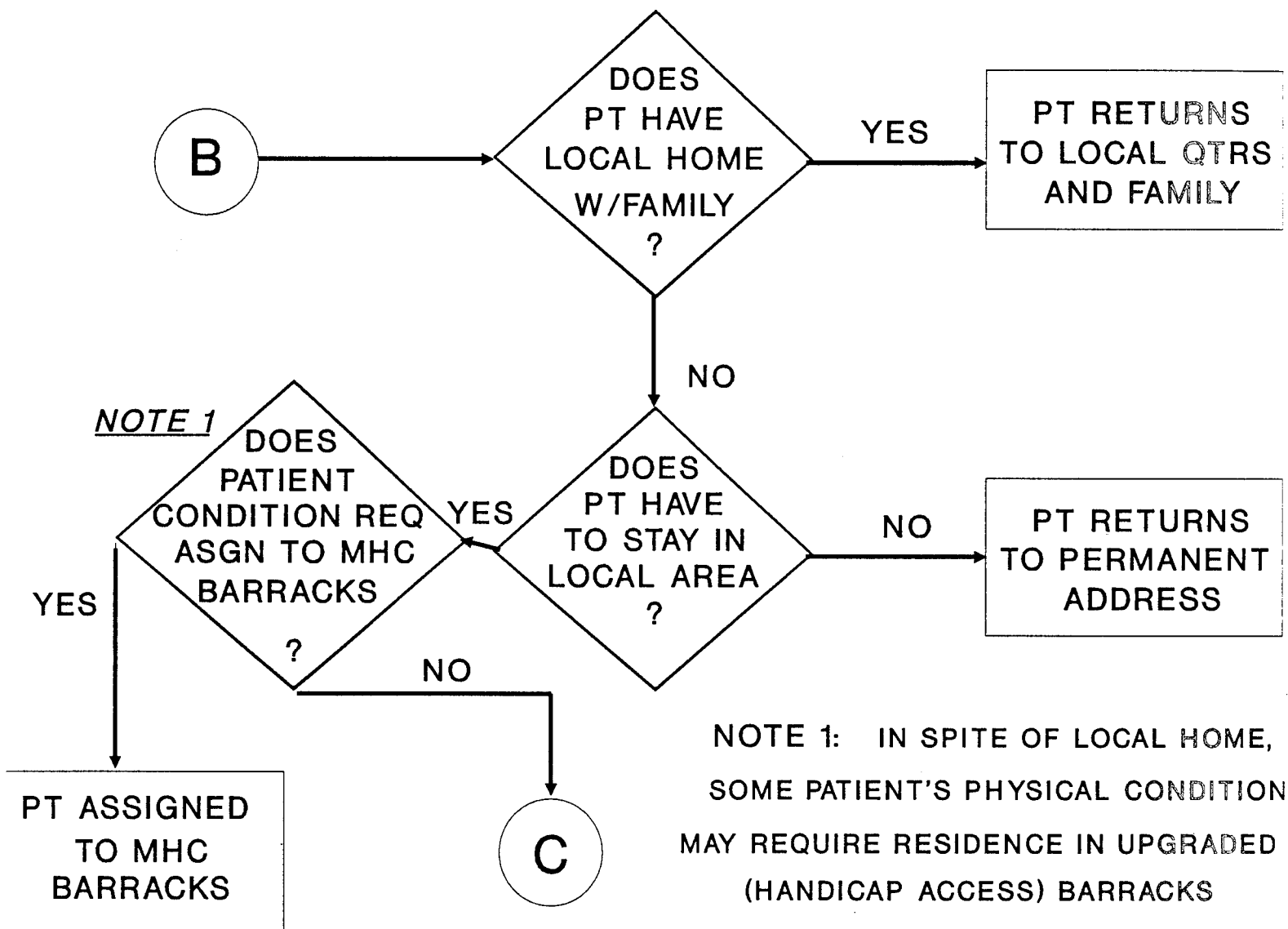


Figure 5-c. Housing Disposition Algorithm - Outpatient Assessment Part 1. Differentiates between patients with local area home and family versus single or geographical bachelor patients. Also considers patients whose medical needs require housing in a facility which has handicapped access features.

## OUTPATIENT ALGORITHM PART 2

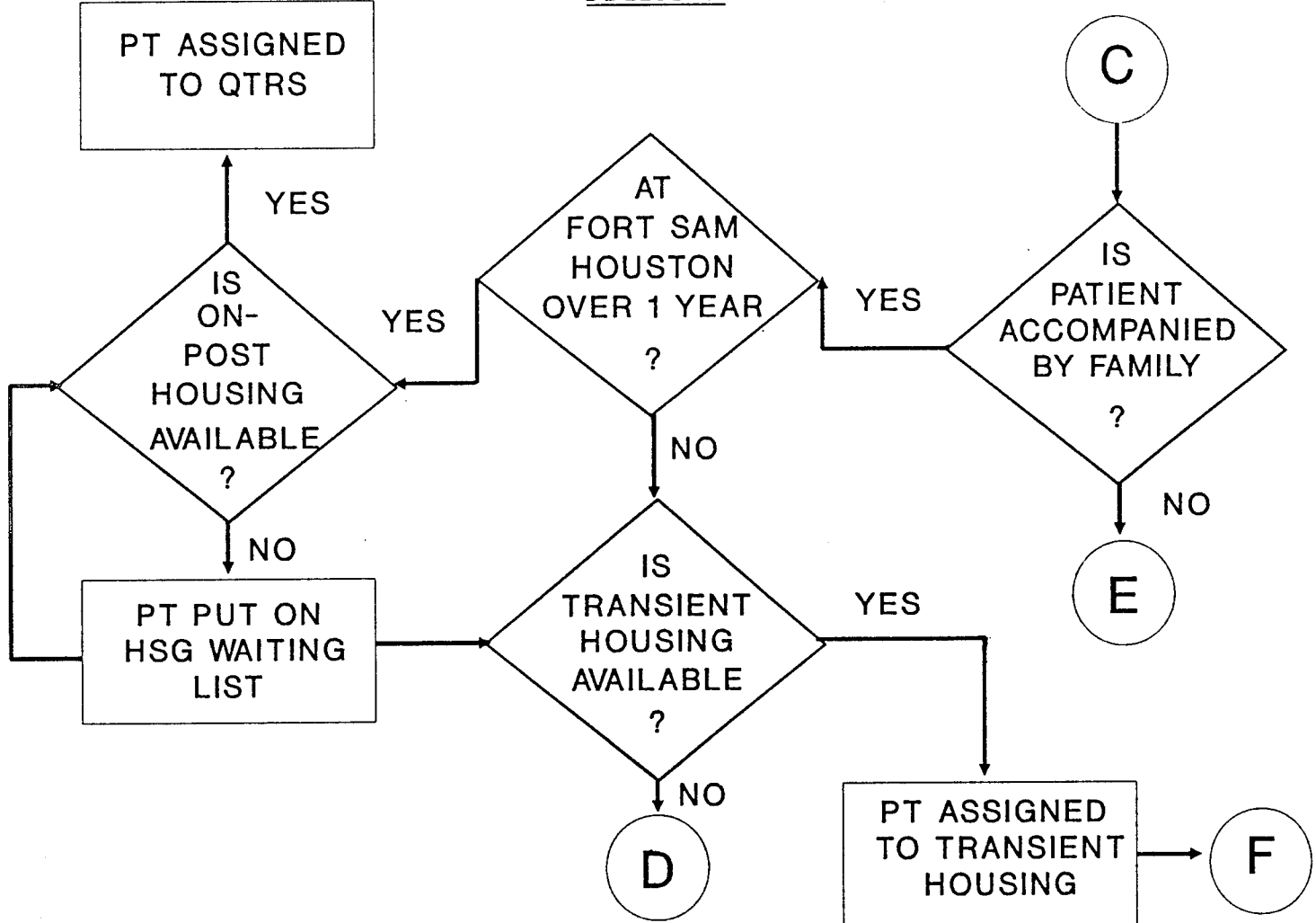


Figure 5-d. Housing Disposition Algorithm - Outpatient Assessment Part 2. Differentiates between patients qualified for on-post permanent housing versus patients qualified for on-post transient housing.

## OUTPATIENT ALGORITHM

### PART 3

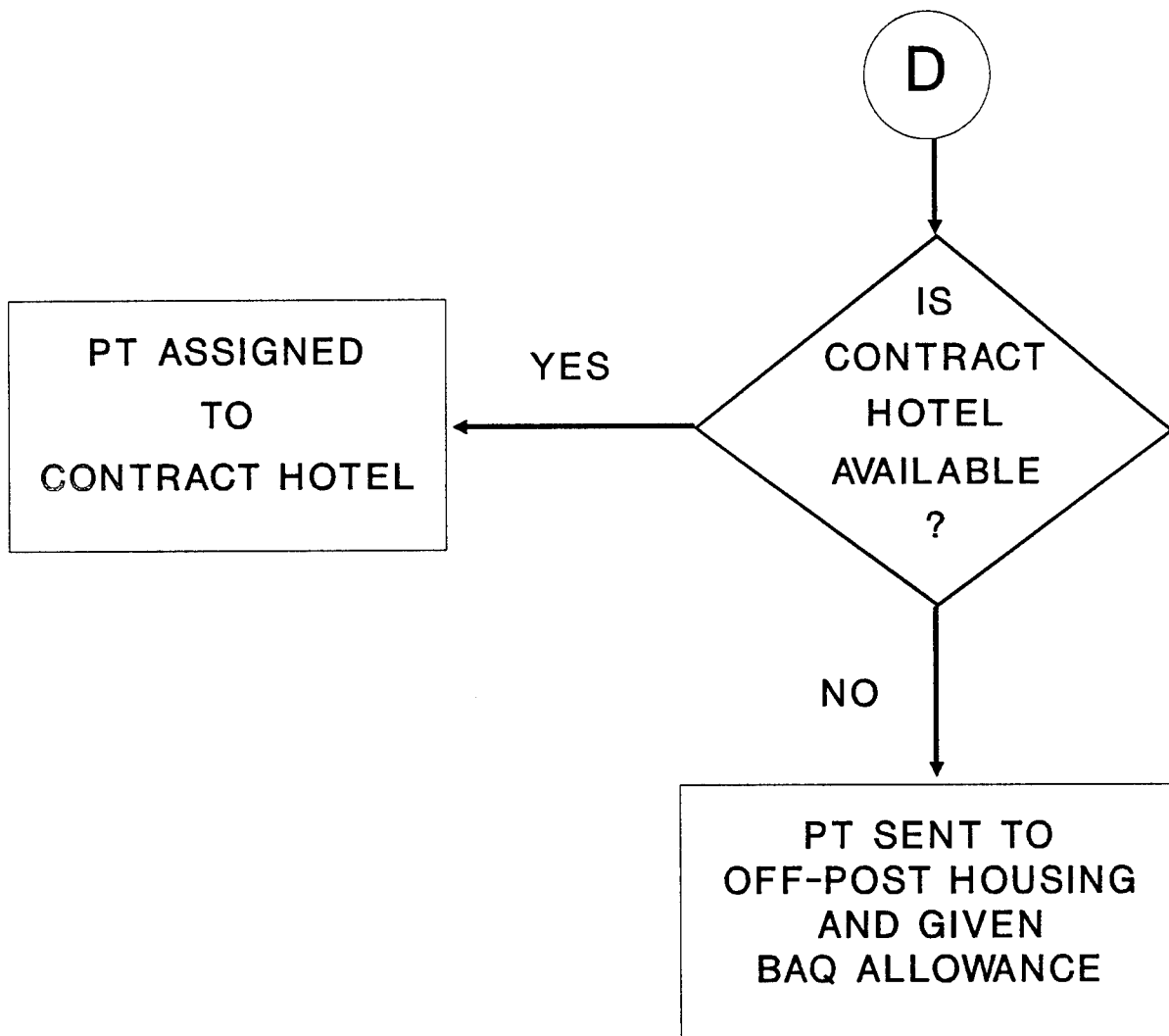


Figure 5-e. Housing Disposition Algorithm - Outpatient Assessment Part 3. Assesses availability and disposition to off-post contract hotel.



## OUTPATIENT ALGORITHM PART 4

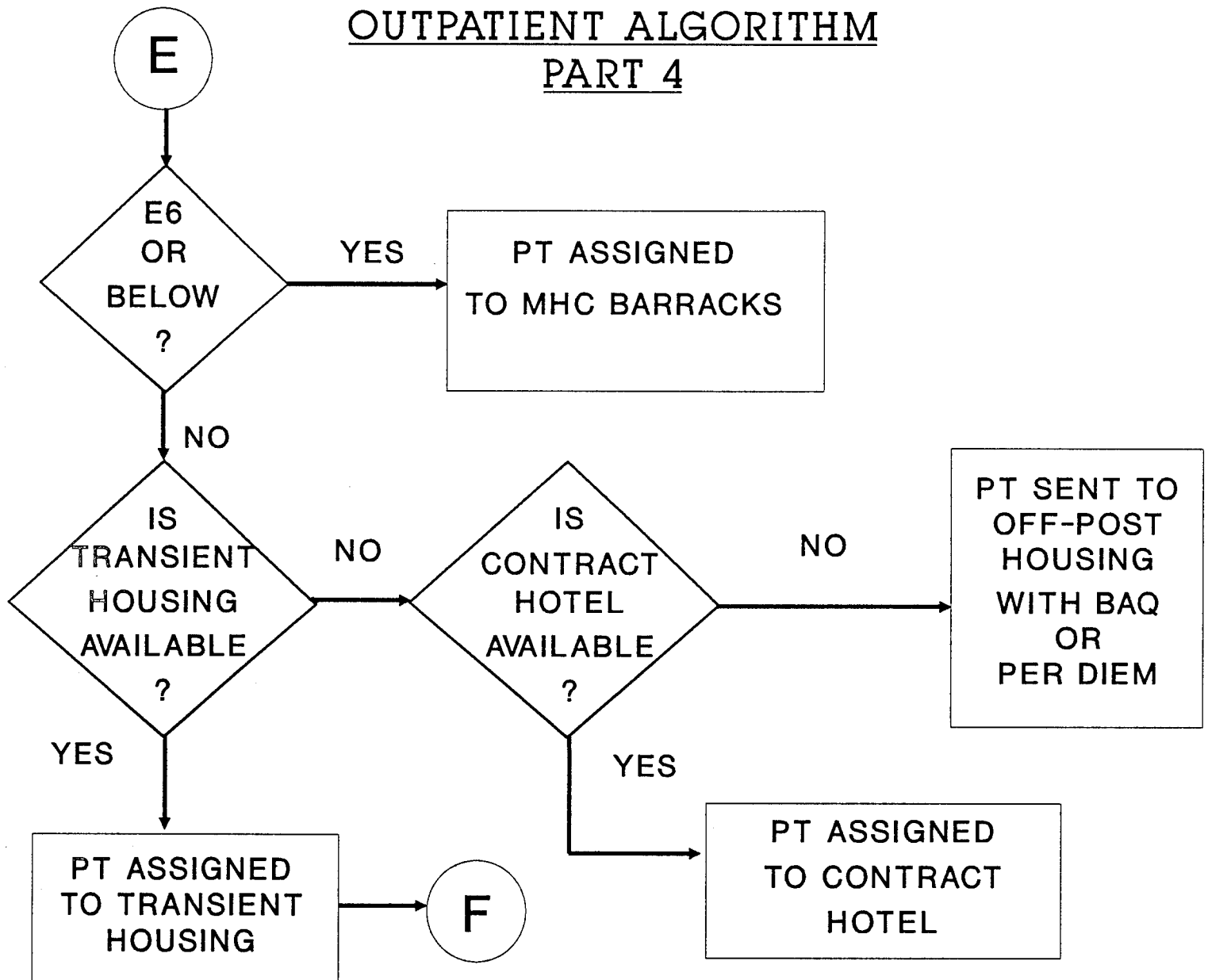


Figure 5-f. Housing Disposition Algorithm - Outpatient Assessment Part 4. Assesses housing disposition based on patient rank and availability of transient and contract housing.

# OUTPATIENT ALGORITHM

## PART 5

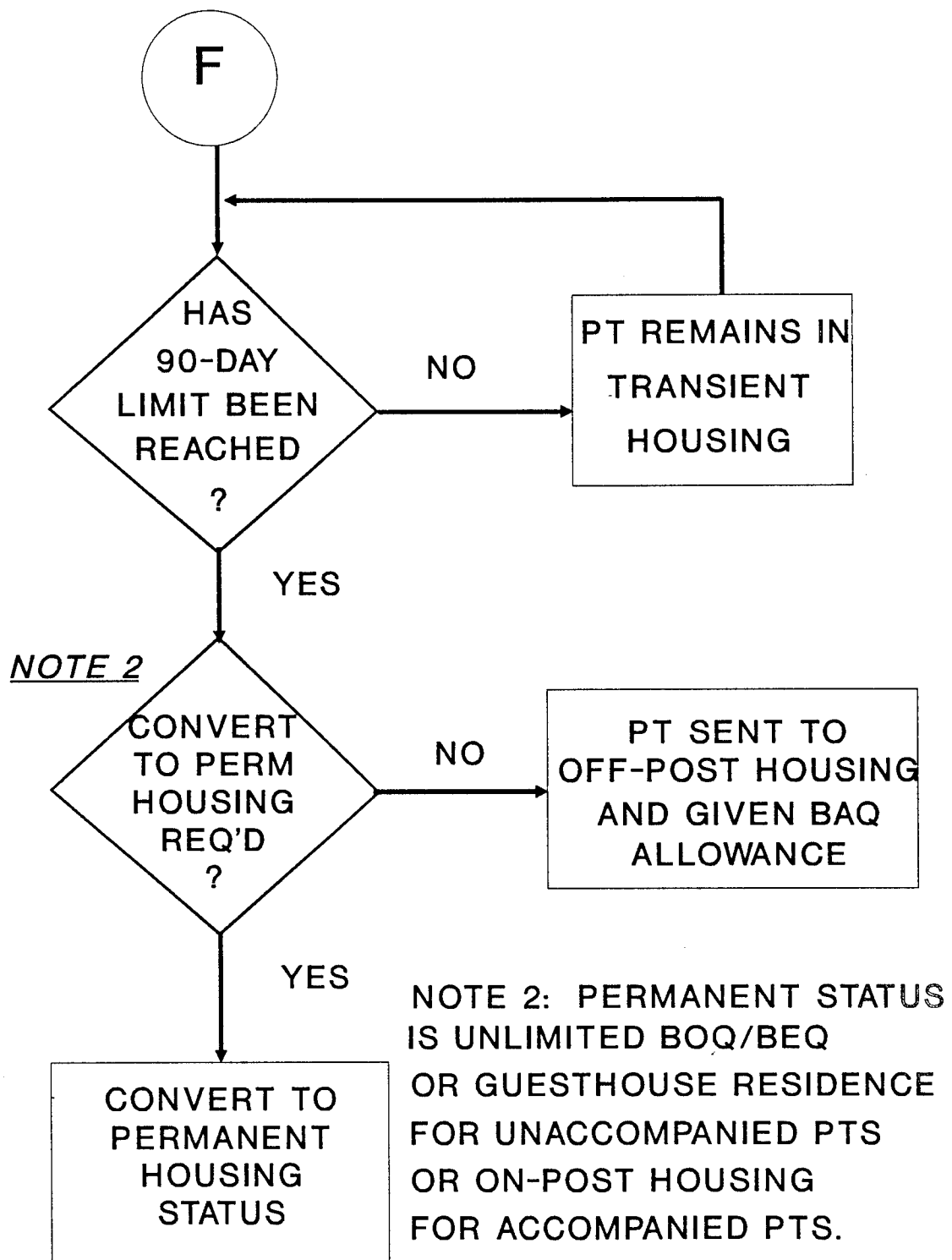


Figure 5-g. Housing Disposition Algorithm - Outpatient Assessment Part 5. Addresses transient versus permanent housing status for long term cases.

## CHAPTER 4

### DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to develop a new patient care model which would effectively place medical hold patients in the most appropriate housing; minimize the economic drain of medical hold patients on BAMC; and standardize and formalize the process by which housing decisions are made. The objectives developed and accomplished in support of this study's purposes, provided the in-depth knowledge and understanding needed to develop this new model. The information attained from achieving these objectives, will be presented in the discussion, conclusions and recommendations presented sequentially in this chapter. Finally, the knowledge and understanding gained through the objectives will be distilled into a concise, new patient care model for housing medical hold patients at BAMC and presented at the end of this discussion chapter.

#### Work Flow Analyses of the Current Patient Care Model: Discussion, Conclusions, and

#### Recommendations

The Work Flow Analyses outlined the current patient care model at BAMC and clearly delineates the inherent shortcomings of the present model encountered by the medical hold patient. It is in the area of housing that the majority of problems with medical hold patients arise. The problems occur in two areas: appropriateness of housing based on the patient's complete care requirements (medical needs, family needs, financial situation), and

the lack of viable housing alternatives.

The majority of medical hold patients eligible for discharge, remain on the hospital wards because appropriate alternative housing cannot be found. There are two main reasons for this. First, the local guesthouse, the Visiting Officers' Quarters (VOQ), the Visiting Enlisted Quarters (VEQ), and even the medical holding barracks, are not outfitted to accommodate physically handicapped patients. They do not meet the patient's medical needs since they lack adequate wheelchair ramps, railings, elevators and bathing facilities. Thus, most post transient housing rooms are not appropriate housing options for patients who are less than completely ambulatory. Additionally, most post transient housing is not designed to accommodate families for long periods of time. Expense is the second major obstacle in finding suitable housing for medical hold patients. Except for patients in the rank of E-6 and below who reside in the medical holding barracks, all housing is at the patient's expense (either through BAQ or per diem). As previously discussed in Chapter 1, this long-term housing expense can be devastating for a soldier and his family. A patient assigned to on-post permanent housing loses his BAQ funding. In this instance, a patient with family, must either relocate the family to the Fort Sam Houston area or bear the expense of maintaining two households without BAQ. In other cases, families in an effort to keep close to the patient, will relocate at their own expense to the BAMC area. Without assistance in obtaining affordable housing, the soldier and family can literally bankrupt themselves on hotel and other travel expenses over the course of a lengthy rehabilitation or board process.

Descriptive Statistics for the Patient Population Sample: Discussion, Conclusions and  
Recommendations

An analysis and understanding of the BAMC medical hold patient population is critical prior to creating and instituting a new patient care model for housing. Proceeding to model implementation without this knowledge could lead to an inappropriate model being enacted. Correlation analyses and crosstabulations among the descriptive variables reveal interesting, but not too surprising trends in the medical hold patient population. A .05 level of statistical significance was chosen in order to ensure that any observed differences due to chance alone would occur less than 5 times out of 100.

The patient age (table 1) tended to be young with 54 percent of the patients under the age of 30 and 85 percent under the age of 40. While increasing age showed a positive correlation with an increasing number of days in the BAMC area (correlation coefficient = .1734;  $p = .020$ ); there was no significant correlation between age and the actual inpatient length of stay (LOS).

The gender distribution (table 2) of the patient sample reflected the general Army active duty population. The medical hold patient sample consisted of 83.3 percent males and 16.7 percent females, while the general Army active duty population reflects 88 percent male and 12 percent female (DA PAO, 1994).

The medical hold patient sample consisted of 63.1 percent married and 36.9 percent single, (table 3) differing from the general Army population which reflects only 47 percent married and 53 percent single (DA PAO, 1994). The females of the sample tended to be

single more often than the men. Sixty-seven percent of the males were married as opposed to only 40 percent of the females. It was impossible to tell from the research data available, which of the patients listed as single actually existed as head of a household and therefore may have been accompanied by dependents during their sojourn at BAMC.

The rank distribution (table 4) of the sample population showed a higher tendency toward the enlisted ranks than was present in the active duty Army (DA PAO, 1994) .

<u>RANK</u>	<u>ACTIVE ARMY</u>	<u>MEDICAL HOLD</u>
OFFICER	14%	8%
WARRANT OFF	2%	2%
ENLISTED	84%	90%

Ninety-five of the 179 patients in the sample (53 percent) were in the grade of E-4 or below. A crosstabulation of rank with geographic origin shows a fairly even distribution of the ranks originating from every one of the four geographical areas.

The breakout of geographic origin (table 5) reveals an extremely important characteristic of the sample population. Eighty-five percent of the sample patients came to BAMC from outside the local area. In other words, 85 percent (N = 152) of these medical hold patients were immediately displaced from their normal homes, families and unit. The impacts on the patient as well as the medical center are enormous. The patient arrives suffering not only from a medical condition, but from an "uprooting" as well. He is now separated from his family and unit support structures at a time when they are most needed.

The medical facility likewise must now support the patient not only from a medical standpoint, but often from unit, psychological and spiritual standpoints as well. Addressing this displacement issue is of paramount concern when creating a new patient housing model for these patients.

The distribution of medical hold patients by the clinical service primarily responsible for the patient's care shows the subjects clustered among a small number of medical and surgical services. In fact, 84 percent of the 179 cases fell into six service categories as reflected by the Pareto Chart at figure 3 (Chapter 3, page 28). Four of the categories are considered medical and two are surgical. Assignment to the orthopedic service accounted for an incredible 28.5% of all medical hold patients (51 out of 179 cases). Neurosurgery was second with 14.5% of the medical hold cases. Internal medicine and psychiatry follow with 12.3% and 11.1% respectively. The remaining thirteen services captured less than 10% each of the remaining patient cases. Surgical cases outnumbered medicine cases by only 3% with surgical cases accounting for 51% of the patient sample versus 48% for medicine cases. The large percentage of orthopedic and neurosurgical cases will become an important factor in subsequent discussion of housing needs.

The month assigned distribution shown in figure 4, (Chapter 3, page 34) shows definite peaks and valleys. Discussion with the Medical Holding Company staff as well as other experienced BAMC staff members, revealed insights into the assignment trends. One large peak occurred in the October and November time frame, coinciding with the onset of the new fiscal year. Units who are low on TDY funds and medical centers who are low on care dollars, may hesitate to assign new patients to the medical holding company until more

monies are available. Thus, the large peak reflects a transfer of end of year patients who were held until the new fiscal year. The largest assignment peak occurred in the May-June time frame. This period coincides with the annual peak of highest physician turnover throughout the Army. Physicians preparing to PCS tend to clear their case loads; transferring long standing cases to the board process, and hence to medical hold. The large assignment of patients in February remains unexplained. This anomaly could have been an irrational, one-time occurrence or an explainable event. Unfortunately multi-year data was not available and therefore, the constancy of these trends cannot be substantiated.

This demographic data is extremely valuable in understanding and planning a housing model for the medical hold patient population. The data provides the following insights, as well as impacts and recommendations, for consideration.

- The high percentage of patients who originate from outside the local BAMC area, (85%) indicates the high probability that a new patient will be displaced from his actual home, family and unit (his entire support structure).

- Since many of the medical hold patients are young, active duty soldiers with families and a long area stay, BAMC should presume they will need assistance in solving complex personal problems (i.e. living arrangements, financial assistance and family social support).

- The high number of orthopedic and neurology cases (43% total) indicate the necessity of upgraded handicapped facilities in the medical holding barracks. A more thorough discussion of this issue will follow under Objective Four.

- The long stays in the BAMC area as compared to other DoD facilities, indicates the



need to examine and modify the local MEB/PEB system in order to speed up processing time and reducing the overall stay in the area. A more thorough discussion of this issue will follow under Objective Four.

- The lack of a multi-year data set hampered trend analysis. The Medical Holding Company would benefit by improved automation equipment to track patients and their outcomes. Recommend the Medical Holding Company receive upgraded automation equipment in the area of database management.

#### Related Trends in Civilian and other DoD Medical Facilities: Discussion,

#### Conclusions, and Recommendations

Literature review and facility surveys revealed that similar problems are occurring in both civilian and other DoD medical facilities. Civilian institutions are attacking the problems in a variety of ways to include increasing the involvement of patients and families in care-giving, implementing step-down care wards, acquiring nearby facilities and converting them into medical hotels, and implementing case management.

Among other DoD medical facilities, surveys revealed that facilities of a similar size have similar problems. While large facilities seem universally to be struggling with similar issues of housing medical hold patients, smaller facilities have better control of patient housing due to medical hold patient populations which originate predominantly from the local area, and are thus easier to house and support. The surveys also disclosed that facilities that have made efforts to shorten their MEB/PEB processing times have dramatically cut down on the associated problems of maintaining displaced medical hold patients. This quicker board

processing time results in advantages for the patients and the medical facility such as shorter family separations, faster patient transition to normal lifestyle, and reduced pressure on local housing facilities. Recommend BAMC initiate a study of the local MEB/PEB processing system with the intent of shortening the process. Recommend the medical board study at Walter Reed Army Medical Center serve as a springboard for the BAMC study of streamlining the medical board process.

Literature review reveals the benefits for both patients and staff of self-care, cooperative care or transitional care models within the facility (Lott, et al 1992 and Grieco, et al, 1990). Recommend BAMC explore the possibility of adopting some of these inpatient care models for medical hold patients as alternatives to keeping these displaced patients on the acute care wards. At other large facilities, the commanders of WRAMC and FAMC have successfully used non-traditional, innovative solutions to solve housing problems associated with medical hold patients. Like the Air-Evac ward at Fitzsimmons Army Medical Center, one related option which entails the creation of a self-care or step-down ward within BAMC. Such a ward would offer room and board with little or no medical supervision. This would be especially useful in the cases of single or geographic bachelor patients for whom placement in the medical holding barracks or guesthouse is medically unsuitable. Having the option to remain inside the facility with proximity to treatment and dining facilities, would appropriately serve this patient sub-population. Medical Holding Company personnel could be detailed to administrate and oversee step-down ward operations, thereby conserving nursing assets. Logistical support (housekeeping, supplies and linen) would be minimal.

However, this possibility is not without a number of drawbacks. First, since most medical hold patients are actually inpatients for the duration of their stay in the BAMC area, maintaining these patients within the facility may necessitate that the ward meet requirements of the Joint Commission on the Accreditation of Hospitals (JCAHO). Second, this arrangement would not alleviate all of the problems patients experience due to long term inpatient stays. Problems due to the lack of privacy, limited security of personal belongings, and the delay of re-integration to mainstream life would remain. Third, the Medical Holding Company's staff (company commander, first sergeant and operations clerk) could not possibly run a step-down ward without additional personnel. Company operations are overseen by the company commander or first sergeant, but are actually done by medical hold patients who have been given temporary responsibilities commensurate with their rank and condition. The oversight of a step-down ward would stretch the capabilities of this unit and would require additional resources from within BAMC's Troop Command. Finally, the maintenance of such long term "boarder" patients may not be compatible with the acute care operations of the medical center. BAMC was not designed as a "hometel" or even as a long term care facility. The presence of fairly healthy, young soldiers may disrupt surrounding ward operations. One option could be to establish such a ward as a temporary shelter only. Patients could stay only a few days while final housing dispositions are arranged or while they make the mental and medical transition to outpatient life. Despite the drawbacks and unknowns, the introduction of self-care, cooperative care or an alternative care ward such as a step-down ward, are models worthy of consideration for implementation at BAMC. These models would free up nursing assets, speed up the patient's return to self-sufficiency and

enhance the patient's transition to outpatient housing.

### Quality Assurance and Risk Management Aspects of the Alternatives:

#### Discussion, Conclusions, and Recommendations

The results of the Quality Assurance and Risk Management roundtable discussion revealed a number of important factors requiring consideration in building a new patient care model for housing. Recommend that a QA or RM representative be included in any process action team established to certify and implement the new patient care model for housing medical hold patients presented in this study. Recommend the current BAMC pass policy and policy of keeping medical hold patients as inpatients, even when released from the ward, be reviewed from a risk management aspect.

### Effects of the Proposed Alternatives: Discussion, Conclusions, and Recommendations

Chapter Three provided an in-depth look at the advantages and disadvantages of each of the proposed alternatives. While each alternative is appropriate for some patients, each alternative alone will not fit all cases, nor are the alternatives mutually exclusive. A specific discussion of each alternative follows to outline the study's final conclusions and recommendations.

### Alternative One: Maintain Displaced Patients on the Acute Care Wards and Implement Self-

#### Care, Cooperative Care or Alternative Care Model

The MEPRS data analysis revealed that maintaining a displaced medical hold patient

on the ward is not as costly as originally believed. While some might consider this an endorsement of Alternative One, "Case closed - leave them on the ward", a deeper analysis is imperative. One of the major problems facing BAMC is not just the expense of resources, but the availability of resources. While providing a bed for a medical hold patient with no other place to go may seem financially trivial based on actual cost data, it must be concurrently viewed as an "opportunity cost" of providing care to more deserving patients. Beds occupied and nursing hours consumed by displaced medical hold patients may preclude entry of other cases into BAMC, forcing them out of the facility and into the CHAMPUS network where the costs of providing care are significantly higher. For the resource considerations alone, Alternative One lacks viability.

#### Alternative Two: Upgrade the Medical Holding Company Barracks

While obviously not well suited for officers, senior non-commissioned officers, or patients with accompanying family members, the medical holding barracks is the ideal disposition option for junior enlisted (E6 and below) single soldiers. The barracks is proximally located to a number of medical and administrative facilities needed by patients. The upgrading of the current medical holding barracks (provision of handicapped access features) would increase the number of patients who could be moved to the barracks as an appropriate living setting. Considering that this upgrading could be accomplished in a relatively low-cost manner, Alternative Two is a feasible alternative for a large portion of the medical hold patient population. Recommend that the Medical Holding Company Commander investigate and pursue the upgrades needed for increasing patient access to the

medical holding barracks.

#### Alternative Three: Provide Dedicated Housing On-Post

Recent changes in the housing policies on Fort Sam Houston have succeeded in disengaging significant portions of the in-transient, military population; specifically those in need of housing for periods of between 30 and 365 days (i.e. students at various AMEDDC&S courses and patients in medical hold status). While this policy change has greatly reduced the transient housing drain on the installation, it is doubtful that the garrison manager meant to reduce the drain at the expense of patients. In all likelihood, the garrison manager and post housing office would gladly adjust the transient policy to grant exceptions for medical hold patients, especially since the patients are such a small percentage of the installation transient population. Recommend BAMC work with the garrison manager and post housing to get blanket exceptions on length of stay limits in transient housing for medical hold patients and family members. Recommend BAMC also work with post housing to obtain reduced rooms rates which match BAQ authorizations. BAMC representatives should emphasize to the garrison management that these soldiers are already undergoing a stressful period, characterized by mental, physical and possibly financial strains, and therefore require sympathy and support beyond that accorded to the normal transient resident.

#### Alternative Four: Construct or Acquire Medical Holding Company Hotel

While medical hold patients and staff would find the acquisition or construction of

their own hotel a fortuitous event indeed, such a move is a long way in the future at best. The funds for such a project are simply not readily available. Additionally, there are a number of other feasible alternatives to housing medical hold patients which can be accomplished at a much lower cost. Consequently, Alternative Four is not a practical option and should not be pursued.

Leasing an off-post medical hotel facility, or leasing an off-post hotel-type structure and renovating it into a medical hotel, were options that were initially considered, but eventually discarded. This occurred as a result of carefully considering the financially and politically sensitive climate in which DoD health care facilities such as BAMC operate. Simply put, it would be imprudent to expend enormous sums of tax payer money on a facility that would be indefinitely needed and whose large fiscal drain on BAMC (via a lease) would also be indefinite. The option of building an off-post facility was also considered and abandoned. This was abandoned because the cost of real estate would make the construction option even less appealing and because federal property on Fort Sam Houston is still available for building use.

Finally, the option of renovating an on-post structure was also considered and temporarily tabled. The installation is currently experiencing a severe and long term shortage of facilities due to the age and deterioration of older buildings as well as the BRAC process which is relocating more operations to the installation (Tolman, 1994). This situation makes the current possibility of gaining a suitable structure for renovation next to nil. For the long term however, the consolidation and movement of BAMC into the new hospital in 1996, create the possibility of a building from among the current BAMC structure

inventory could becoming available for consideration. At that time, renovation into a medical hold hotel could be contemplated.

#### Alternative Five: Contract With an Off-Post Hotel for Lodging

The concept of contracting with an off-post hotel or motel to provide transient housing is not a new idea at Fort Sam Houston. Other on-post agencies, such as the AMEDDC&S, regularly place students in off-post hotels through the post contracting office. Since this alternative already exists at Fort Sam Houston, Alternative Five could serve as a functional solution. Recommend BAMC explore contract arrangements with a local hotel, motel or apartment for long term patients.

#### Alternative Six: Authorize Per Diem or Subsist-Out Status

This alternative addresses two methods of financing patient housing. The per diem option is only good for short term needs. Parent units and Health Services Command will only authorize per diem payments for as short a period as absolutely necessary; usually under 30 days. Patients anticipating a greater than 30-day stay in the BAMC area are essentially forced to make more permanent living arrangements to relieve the financial burden on their parent unit or Health Services Command by coming off TDY status and moving into the medical hold barracks or into a subsist-out status. The subsist-out method is appropriate for longer stays, and for officers and senior enlisted soldiers, and is financed through normal BAQ and BAS payments. Since both of these financing methods are currently in use, Alternative Six has a definite, continued role in solving the medical hold housing issue at



BAMC.

Alternative Seven: Develop Algorithm to Evaluate Each Case

Reducing the process of determining the "best fit" housing disposition for medical hold patients to an algorithm yields two results: first, standardization of a complex process and second, significant cost saving applications. Currently, Medical Holding Company staff evaluate each patient's situation to determine the best housing and support structure possible. The system operates on an "ad hoc" basis in the absence of a standardized protocol. This evaluation process is constantly repeated within this standardless environment, resulting in an ever changing process and ever changing outcomes. Patently similar patient situations often have different solutions applied due to this lack of formal standards. An algorithm will streamline the process, reduce delays and uncertainty for the patient and his family, and ensure the patient gets the most appropriate housing for his medical and personal situation. From BAMC's viewpoint, an algorithm will ensure the patient is placed in the most cost-effective and medically appropriate setting.

Although algorithms have been proven to be effective in health care, they, like any tool, have advantages and disadvantages (Sadler, 1986). They are useful in streamlining complex processes and facilitating cost and process analysis. On the other hand, an algorithm is only as good as its design - in other words, an algorithm constructed with bad data, too little data or too much data will lead to faulty conclusions. Prior to adoption and implementation, the algorithm presented in Chapter 3 of this study must be carefully scrutinized for accuracy and possible improvement.

The key to intelligent use of this algorithm is the realization that it is only advisory.

While the algorithm could certainly be BAMC's primary tool in making decisions on how to best attack the housing needs of medical hold patients as a group, it is only an aid in deciding the housing needs of a specific individual. It is not meant to serve as a stringent rule at the exclusion of common sense or professional staff judgement. Nonetheless, recommend Alternative Seven be pursued as the keystone of solving the dilemma of housing BAMC's medical hold patient population.

#### Proposed New Patient Care Model for Housing Medical Hold Patients at BAMC

The goal of Brooke Army Medical Center is to provide high quality patient care while efficiently and effectively using available resources. A substantive and practical means of moving toward this goal is through the development and use of patient care models. Use of these models can help to establish standard methods of combining quality care provision with efficient resource use. While hospital inpatients are the natural focus for creating patient care models, patients who do not exist within the normal inpatient realm (along with BAMC) can also benefit from model development and implementation. Providing care for a patient group which exists mainly outside the medical facility is currently left mostly to chance. An organized approach is needed, since this patient group often encounters far greater problems and obstacles than inpatients who are cushioned and cocooned from the outside environment. An analysis of the current system for medical hold patient housing at BAMC revealed the need for developing a new patient care model.

A new patient care model will serve a number of functions. First, it will serve as a pictorial depiction of a proposed framework to conceptualize the complex patient housing

process into a short, simple representation (Duncan, 1992). Second, it demonstrates the inter-relationships and underlying logic of patient housing phenomenon (Duncan, 1992). Finally, considering the similarities between the medical hold processes at other large DoD facilities, such a model could serve as a generalizable platform for other DoD facilities who wish to implement serious study and revision of their own medical hold housing processes. All of the lessons learned, and the housing aspects of medical hold patients examined, in this study are summed up in the ensuing model.

The patient care model developed in this study is shown in figure 6. This model is based on Porter's model for "Strategic Management Process in Health Care Organizations" (Duncan, 1992). The model begins with a consideration of the pressures placed on BAMC by the external environment. Cognizance of these pressures and their effects is critical to understanding what is taking place outside the organization in order to discern the concomitant threats and opportunities inside the medical center. Influencing factors existing as part of the external environment setting include the availability of on and off-post housing, installation housing policies, JCAHO and governmental (Americans with Disabilities Act) guidelines, the number and type of medical hold patients being referred to BAMC, and the funding policies and constraints placed upon BAMC by Health Services Command. All of these factors play upon BAMC's ability to cope with the housing needs of medical hold patients.

# PATIENT CARE MODEL FOR HOUSING MEDICAL HOLD PATIENTS AT BAMC

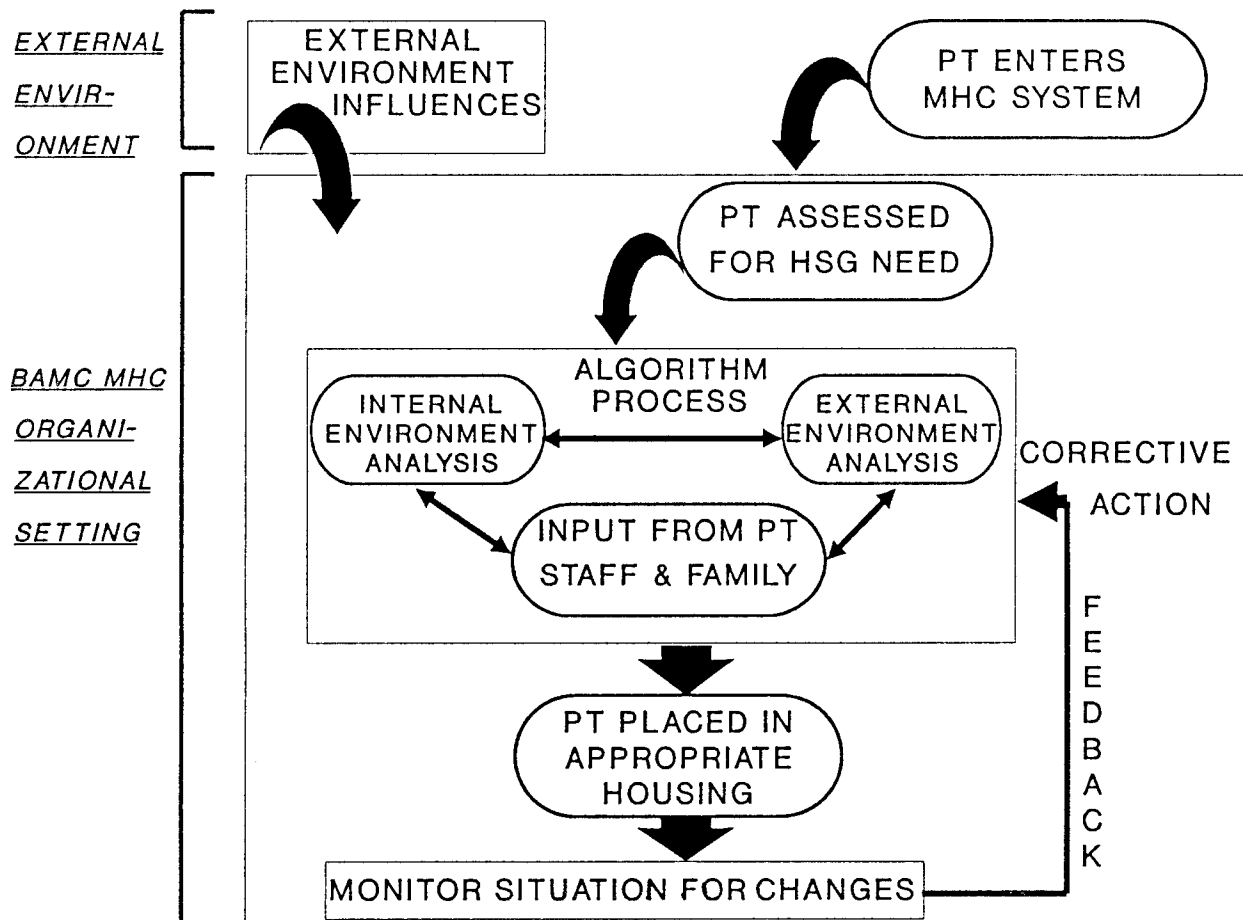


Figure 6. Patient Care Model for Housing Medical Hold Patients at BAMC.

Following consideration of the external environment, the model introduces the patient into the medical hold system by assignment or attachment to the Medical Holding Company. At this point a preliminary assessment of the patient's housing needs by the Medical Holding Company staff. This information is fed into the next step of the model, the algorithm process, (outlined in Chapter 3) which comprises the heart of the model by considering and consolidating all the relevant aspects of medical hold patient housing. The algorithm process is represented in the model by three inter-active ovals: external environment analysis, internal environment analysis and input from the patient, staff, and family. The influences of the external environment, (housing, policies, budget), are considered as to how they affect the housing selection of each individual patient. The internal environmental analysis focuses inward on BAMC to determine the internal strengths and weaknesses of the medical center in relation to supporting medical hold patient housing. The strength of the current BAMC medical hold system is a strong culture of a caring and dedication by a knowledgeable staff, both at the Medical Holding Company, and throughout the entire facility. Weaknesses include a shortage of nursing and support staff, limited budget, limited inpatient beds, barracks without handicapped features and shortage of Medical Holding Company staff. Finally, the most critical part of the algorithm is the input from the staff, patient and family. The expertise of the staff (Medical Holding Company, social workers, physicians), coupled with the express needs and desires of the patient and his family, complete the algorithm process by supplying specific information used to tailor the appropriate housing alternative to the patient situation.

Once the initial algorithm processing is completed and the appropriate housing

alternative selected, the next step is to place the patient in housing. In this phase of the model, the best alternative, revealed by the algorithm, is actually implemented for the patient and family. However, the model process does not stop here. As long as the patient is assigned to the Medical Holding Company, he is constantly monitored by the company staff to ensure the continued fit of the housing solution. Changes in the patient's medical, financial or family situation will cause the medical company and provider staff to re-enter the algorithm process to reassess the patient's housing needs. This system of feedback and, if necessary, corrective action, forms the control loop which keeps the model alive and responsive to fluctuating patient situations. Thus, the model is actually a process of strategic formulation, implementation, and control, focused on providing the "best fit" housing alternative for each patient.

## CHAPTER 5

### SUMMARY

The purpose of this study was to develop a new patient care model which would effectively place medical hold patients in the most appropriate housing; minimize the economic drain of medical hold patients on BAMC; and standardize and formalize the process by which housing decisions are made. The study's objectives included analyzing and evaluating the effectiveness of BAMC's current patient housing model; determining alternative housing options; reviewing similar problems and current trends in civilian and DoD facilities; determining the financial and psychological impacts of various models on patients, families, BAMC and Fort Sam Houston; determining the criteria essential to developing a new patient housing model; and finally, developing a new patient care model for the medical center to build upon. These objectives were all achieved through the course of this project and are documented in detail in the preceding chapters.

The pivotal finding of this study is that the uniqueness of each patient's case mandates the development of a new patient care model that allows housing dispositions as distinctive and unique as each patient's situation. The Judge Model result, suggesting the algorithmic approach, should be intuitively obvious to health care providers at all levels: patients are individuals and hence, do best when their individual cases are managed individually. So while the research and corresponding results plainly demonstrated that any of the seven alternatives analyzed in this study could be applicable in any one case or another, the

alternative that clearly emerged as the best - *was the one that included them all.*

Unfortunately, this finding implies that there is no simple, "one-housing-option-fits-all" solution to this problem. In fact, the complexity of this issue is exactly why the problem has existed for so long at medical facilities throughout DoD. Nonetheless, BAMC has the requisite tools and experience to implement the algorithmic solution. Just as BAMC healthcare providers carefully manage the individual medical care plan of medical hold patients, so must the patient's housing plan be managed carefully and individually as well. The overall care plan of the medical hold patient must be holistically expanded to encompass the patient's every need (housing, financial, family, etc..) and in light of the resource constraints placed upon the organization providing the support (BAMC and Fort Sam Houston).

The expansion of the existing housing options and the implementation of the housing algorithm will go far toward fulfilling this need. However, not all of the housing alternatives presented in this study are currently available. In order to implement the algorithmic solution, BAMC must investigate and coordinate expansion of the currently unavailable housing options, such as establishing a self-care ward, upgrading the medical holding barracks, contracting with an off-post hotel, obtaining priority housing, and securing exceptions to length of stay limits in transient housing. Shortening BAMC's portion of the MEB/PEB processing time is another key change that BAMC must investigate, coordinate and implement since this change could greatly impact on housing requirements. The synergistic effect of implementing all or some of the above solutions will serve to reduce the use of expensive inpatient services such as nursing staff and available beds, engender cost



savings for BAMC and produce more patient-oriented solutions.

This study has determined that BAMC should and can establish an improved patient care model for housing medical hold patients. Once implemented, this model will afford greater flexibility in tailoring patient care to meet patient needs, create significant cost saving opportunities, and provide criteria for additional resource utility studies at BAMC.

Suggested further research includes a study into implementing self care and cooperative care models into BAMC's acute care settings and a study aimed at reducing the MEB/PEB processing time at Fort Sam Houston. On a more far reaching plane, this study could be disseminated for reflection and use by other military medical treatment facilities seeking to solve similar housing issues for medical hold patients.

APPENDIX 1  
MEDICAL HOLD COMPANY STUDY

QUESTIONNAIRE FOR RELATED TREND INTERVIEWS AT OTHER DOD  
FACILITIES

FACILITY:

DATE:

PERSON INTERVIEWED:

1. What is the average size of your Medical Hold Company?
2. From where do the soldiers assigned originate?
3. What disposition options do you have for maintaining these patients?
4. What type of problems have you experienced in housing these patients?

5. What about long-term patients who require some medical assistance in daily living activities?

6. Do you have any special financing arrangements for maintaining Medical Hold Company patients?

7. Have you developed any unique methods or models in the care of these patients?

8. I am planning to cite your facility in the study. May I cite your name or would you prefer to remain anonymous?

APPENDIX 2  
EXPERT PANEL MEMBERS

PANEL #	NAME	TITLE
1	COL Herbert Reamey	BAMC Chief of Staff
2	COL William Strampel	BAMC Deputy Commander
3	COL Gail Croy	BAMC Chief Nurse
4	LTC Michael Loader	BAMC Resource Manager
5	COL Paul Dodd	BAMC Chaplain
6	CPT Kathy Beck	BAMC MHC Commander
7	CSM Edward Jiru	BAMC CSM
8	LTC John Neptune	BAMC Troop Commander
9	Ms. Cindy Perry	BAMC QA Coordinator
10	LTC Judy Terry	BAMC Nurse Methods Analyst
11	CPT David Budinger	BAMC Baylor Resident
12	Mr. Kenneth Roberts	FSH Garrison Manager
13	Ms. Katie Gerber	BAMC Patient Representative
14	LTC Frank Berlingis	BAMC Chief of PAD

**APPENDIX 3**

**EXPERT PANEL  
CRITERIA SURVEY**

**GRADUATE MANAGEMENT PROJECT  
FOR  
MAJOR DAWN M. SMITH**

**U.S. ARMY-BAYLOR UNIVERSITY**

AS PART OF MY GRADUATE YEAR HERE AT BAMC, I AM CONDUCTING A STUDY AIMED AT DEVELOPING A NEW PATIENT CARE MODEL FOR MEDICAL HOLD PATIENTS ASSIGNED TO BAMC. TO FAMILIARIZE YOU WITH THE STUDY, A BRIEF ABSTRACT IS ATTACHED - (SEE ENCLOSURE).

BASED ON MY RESEARCH THUS FAR, I HAVE DEVELOPED A NUMBER OF ALTERNATIVES AIMED AT SOLVING THIS ISSUE. NOW I NEED YOUR HELP IN COMPLETING THE STUDY. AT THIS POINT, I REQUIRE THE INPUT OF AN "EXPERT PANEL" AS AN OBJECTIVE METHOD OF FORMULATING AND WEIGHTING MY DECISION CRITERIA. THESE DECISION CRITERIA WILL THEN BE APPLIED AGAINST THE VARIOUS ALTERNATIVES IN A DECISION MODEL TO DETERMINE THE MOST EFFICIENT AND EFFECTIVE ALTERNATIVE.

DURING MY PRELIMINARY RESEARCH, FOURTEEN CRITERIA EMERGED AS BEING RELEVANT TO THIS STUDY. YOUR TASK IS TO DETERMINE THE IMPORTANCE OF EACH OF THESE CRITERIA BASED ON YOUR OWN EXPERTISE. PLEASE EVALUATE EACH CRITERION ON ITS OWN MERITS. DO NOT COMPARE THEM AGAINST ONE ANOTHER OR ATTEMPT TO RANK THEM. IN ORDER TO UNIFORMLY RATE THE CRITERIA, CONSIDER HOW YOU WOULD COMPLETE EACH SENTENCE SHOWN BY FILLING IN THE BLANK WITH AN APPROPRIATE RATING. THE CHOICES FOR RATINGS APPEAR BELOW THE SENTENCE; PLEASE CIRCLE THE APPROPRIATE CHOICE. HERE'S AN EXAMPLE USING A PHONY CRITERION:

" THE PRICE OF TEA IN CHINA WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE MODEL FOR MEDICAL  
HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT  
IMPORTANT

SLIGHTLY  
IMPORTANT

SOMEWHAT  
IMPORTANT

VERY  
IMPORTANT

EXTREMELY  
IMPORTANT

THE ACTUAL SURVEY STARTS ON THE NEXT PAGE. THANK YOU FOR  
YOUR COOPERATION AND ASSISTANCE!

1. " THE **FINANCIAL COST TO BAMC** WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT IMPORTANT	SLIGHTLY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
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2. " THE **FINANCIAL COST TO FSH** WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE MODEL FOR MEDICAL  
HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT IMPORTANT	SLIGHTLY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
------------------	-----------------------	-----------------------	-------------------	------------------------

3. " THE **FINANCIAL COST TO THE PATIENTS AND THEIR FAMILIES**  
WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING A  
NEW PATIENT CARE MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT IMPORTANT	SLIGHTLY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
------------------	-----------------------	-----------------------	-------------------	------------------------

4. " THE **PATIENT'S CONVENIENCE** WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE MODEL FOR MEDICAL  
HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT IMPORTANT	SLIGHTLY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
------------------	-----------------------	-----------------------	-------------------	------------------------

5. " THE COMMAND AND CONTROL OF PATIENTS WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT IMPORTANT	SLIGHTLY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
------------------	-----------------------	-----------------------	-------------------	------------------------

6. " THE QUALITY OF CARE WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE MODEL FOR MEDICAL  
HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT IMPORTANT	SLIGHTLY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
------------------	-----------------------	-----------------------	-------------------	------------------------

7. " THE RISK MANAGEMENT ASPECT WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT IMPORTANT	SLIGHTLY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
------------------	-----------------------	-----------------------	-------------------	------------------------

8. " THE ABILITY OF THE PATIENT TRANSPORT SYSTEM TO HANDLE THE  
LOAD WOULD BE A(N) \_\_\_\_\_  
CONSIDERATION IN DEVELOPING  
A NEW PATIENT CARE MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT IMPORTANT	SLIGHTLY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
------------------	-----------------------	-----------------------	-------------------	------------------------



9. " THE AVAILABILITY OF LOCAL CIVILIAN LODGING WOULD BE A(N)  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT	SLIGHTLY	SOMEWHAT	VERY	EXTREMELY
IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT

10. " THE AVAILABILITY OF ON-POST LODGING WOULD BE A(N)  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT	SLIGHTLY	SOMEWHAT	VERY	EXTREMELY
IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT

11. " THE IMPACT ON ON-POST LODGING WOULD BE A(N)  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT	SLIGHTLY	SOMEWHAT	VERY	EXTREMELY
IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT

12. " THE IMPACT ON INPATIENT NURSING STAFF WOULD BE A(N)  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT	SLIGHTLY	SOMEWHAT	VERY	EXTREMELY
IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT

13. " THE IMPACT ON AVAILABLE BEDS AT BAMC WOULD BE A(N)  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT	SLIGHTLY	SOMEWHAT	VERY	EXTREMELY
IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT

14. " THE PREFERENCE OF THE ATTENDING PHYSICIAN WOULD BE A(N)  
CONSIDERATION IN DEVELOPING A NEW PATIENT CARE  
MODEL FOR MEDICAL HOLD PATIENTS AT BAMC."

(CIRCLE ONE OF THE BELOW CHOICES)

NOT	SLIGHTLY	SOMEWHAT	VERY	EXTREMELY
IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT	IMPORTANT

CAN YOU THINK OF ANY CRITERIA I MAY HAVE MISSED THAT YOU BELIEVE  
NEEDS TO BE CONSIDERED?

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

THANKS AGAIN FOR YOUR HELP! I'LL LET YOU KNOW HOW IT TURNS OUT.

MAJOR D. SMITH

PROJECT ABSTRACT  
Conditions Which Prompted the Study

Currently, Brooke Army Medical Center (BAMC) finds itself coping with a group of "displaced" inpatients who do not meet the criteria for remaining hospitalized. For the purposes of this study, a displaced patient is an ill or injured active duty soldier who is not medically fit to subsist alone in the medical hold barracks or has no local family to assist in his care, transportation and housing. These displaced patients, assigned to the BAMC Medical Holding Company, are undergoing long-term rehabilitation or treatment regimens, or are awaiting processing through the Medical Evaluation Board or the Physical Evaluation Board (MEB/PEB) process. BAMC maintains these displaced soldiers as inpatients during their treatment or board processing due to a lack of feasible housing alternatives. The duration of their stay may be weeks or months. During this time, BAMC and its staff serve as the patient's interim home and family; a surrogate arrangement which serves as a suboptimal solution for both the facility and the patient. The genesis of this study was a desire by the BAMC leadership to develop a more efficient patient care model.

Patients may fall into the displaced category for a variety of reasons. Ordinarily, medical hold patients are of a low medical acuity and in normal circumstances would be sent home to complete their rehabilitation, treatment or processing on an outpatient basis. However, a lack of local housing and family support thwart this normal procedure. Some patients are assigned to BAMC from outside the local area and thus are displaced from their normal residence and family support structure. Other patients are single soldiers or geographical bachelors who live alone in local housing. In these cases, their physicians are

unwilling to return them to living alone until they are completely recovered.

Keeping these displaced patients as inpatients presents two major problems to the medical center. First, inpatient resources allotted to these displaced patients may be viewed as missed opportunities to treat new or additional patients. Thus, these low medical acuity patients drain nursing staff and beds away from more acutely ill patients. During the era when Medical Work Units (MWU) drove the reimbursement system, medical hold patients were welcomed as a low resource-intense way to garner additional workload units and hence additional funding. In today's era however, the capitation budget arrangement rewards minimum, not maximum, lengths of stays for patients. Displaced patients now present an economic challenge to BAMC which not only could utilize the beds and staff more efficiently for the care of acutely ill patients, but could be penalized economically for maintaining inpatients beyond the necessary stay limit.

Second, in addition to the deleterious effects of this arrangement on the hospital, negative consequences befall the patients and their families as well. Being hospitalized is often a less than pleasant experience and, given the choice, most people would opt for being released from the hospital as soon as possible. Lengthy hospitalization can sometimes result in negative psychological effects such as depression or confusion. Additionally, the prolonged hospitalization of a family member is often a hardship upon the remaining family. In the case of a patient who is admitted to BAMC from a post far away, the patient's feelings of isolation and the family's difficulties are compounded by distance. Many family members, in an attempt to remain close to the patient, will relocate at their own expense to

the BAMC area. Over the course of a lengthy rehabilitation or board process, the soldier and family can literally bankrupt themselves on hotel and other travel expenses.

There are a number of factors which contribute to make this a timely issue. The issue was raised by the BAMC Medical Holding Company Commander who felt that the current system of maintaining these soldiers as inpatients was not only expensive and burdensome to BAMC, but failed to meet the financial and psychological needs of the soldier and his family. Additionally, the shortage of nursing staff, the move to capitation budgeting and the effects of a down-sized hospital operating budget all combine to add impetus to analyzing and solving the question of efficient housing of BAMC's displaced patients.

#### Statement of the Problem

The alternatives to maintaining displaced patients as inpatients at BAMC are extremely limited. Additionally, BAMC has no efficient model to evaluate and place displaced patients as they enter the medical hold system.

#### Purpose

The purpose of this study is to develop a patient care model describing the most efficient housing disposition method for displaced patients assigned to the Medical Holding Company at BAMC. There are two main goals of this study. The first goal is to maximize the medical benefit provided to medical hold patients by providing the most appropriate setting for their condition; minimizing the difficulty of transitioning to the patient's new health state; and minimizing financial and psychological hardships. The second goal is to minimize the resource drain caused by maintaining medical hold patients at BAMC.

## APPENDIX 4

### COST ESTIMATE CALCULATIONS FOR A MEDICAL HOLDING COMPANY HOTEL

To determine the financial impact of constructing and operating an on-post hotel facility for medical hold patients with families, seven aspects were researched: hotel design, hotel size (total square feet and square footage by room), construction costs, furnishing costs, maintenance costs, permanent staff expenses and real estate costs.

Discussions with the Medical Holding Company staff and in-depth analysis of the medical hold patient population, resulted in the development of a facility appropriate for BAMC's medical hold population. The facility should be capable of supporting up to ten patients and families simultaneously. Specifically, the hotel should have ten large bedrooms each with individual bathroom facilities. The hotel communal areas should encompass a large kitchen, laundry, supply, and pantry facilities, dining area and a family activity area (with TV, tables, lounge furniture). Additionally, the facility should meet the provisions of the Americans with Disabilities Act (be equipped with wheelchair ramps, toilet and shower access for the handicapped, door and hallway widths adequate for wheelchairs, parking spaces and a an internal elevator or wheelchair lift if multi-storied).

To determine the size of the proposed facility, a comparison was made with BAMC's Fisher House. The Fisher House is very similar in design and purpose to what would be needed in the Medical Holding Company hotel project. The Fisher House is a six family unit built to house families of patients receiving long term treatment at BAMC. It was

conceived and operates along the same lines as the Ronald McDonald Houses in the civilian community. To adjust for comparison, the square footage equivalent of four additional bedrooms with baths, and expanded communal areas (kitchen, dining room, laundry, supply, and family activity area) were added to the size of the Fisher House to come up with an estimated size for a medical holding hotel. A size comparison is shown below:

	<u>FISHER HOUSE (actual)</u>	<u>MHC HOTEL(estimated)</u>
Communal space:	1,956 sq ft	3,956 sq ft
Bedrooms (378 sq ft each)	<u>2,268 sq ft</u> (6 bdrms)	<u>3,780 sq ft</u> (10 bdrms)
TOTAL SQ FT	4,224 sq ft	7,736 sq ft

Hence, the estimated size of the facility equates to 7,736 square feet.

The cost estimate of this facility involves three components: construction, furnishings and maintenance. To estimate the construction costs, two generally accepted sources of reference were utilized. The first was Mean's Building Construction Data - 1992. This source supplied a median construction figure of \$45.60 per square foot to construct a typical one to three story, multi-unit residency (Mean's, 1992). This cost estimate includes all basic construction (masonry, electrical, plumbing, heating and air conditioning), and site work (parking lots and rudimentary landscaping). Next, this typical cost was adjusted specifically to the medical hold hotel project through the use of an Area Conversion Scale. This factor considered the size of the proposed medical hold hotel project versus the industry average size for a small multi-residency. Since the proposed project (7,736 sq ft) was under the

industry average size (21,000 sq ft) the economies of scale rule imposed a final estimated construction cost per square foot of \$50.16. Thus, under this reference, the estimated cost of building a ten-unit hotel facility would be approximately \$388,037.76.

The second data source was the 1992 Building Cost Manual by Craftsman. This reference offered various construction quality categories to choose from. For this study, category 2 (Good) was selected; the other choices being Best, Average and Low. The category offered a typical building cost of \$48.30 for a multi-family residence with ten or more units (Craftsman, 1992). At this rate, a ten-unit hotel facility would cost \$362,250.00 to build.

To both cost estimates (\$50.16 sq ft and \$48.30 sq ft) were added the costs to make the facility meet the requirements of the American's with Disabilities Act (ADA). This additional expense resulted in an increase of \$10,000.00 for the facility. Hence, the cost estimates for constructing a ten-family hotel for medical hold patients revealed an average cost of \$49.79 per square foot for an average total price of \$385,143.88.

The next cost consideration was furnishing the hotel. The price estimates for furnishings were calculated in four steps. The first step outlined the number and type of furnishings and housewares needed. The second step involved obtaining a price for each item from a general furniture and housewares catalog and then multiplying the number of items by the price for each to get a total cost. The third step involved adding the cost of carpeting and decorative art. Finally, the average 35% discount for government purchase was applied to achieve a bottom line estimate for furnishings (Heinmeyer, 1994). The cost of furnishing each room and the entire facility are shown in the following tables.



<u>ITEM</u>	<u>NUMBER</u>	<u>COST</u>	<u>TOTAL COST</u>
<u>BEDROOMS</u> (Listing for one bedroom suite x ten suites)			
sleeper couch	1	550.00	5,500.00
double bed	2	500.00	10,000.00
dresser	2	400.00	8,000.00
night stands	4	220.00	8,800.00
night stand lamps	4	25.00	1,000.00
mirror	1	99.00	990.00
clock radio	1	25.00	250.00
telephone	1	29.00	290.00
desk	1	240.00	2,400.00
desk chair	1	50.00	500.00
television (19")	1	250.00	2,500.00
television stand	1	70.00	700.00
blanket	4	38.00	1,520.00
pillow	6	25.00	1,500.00
sheet sets, dbl	3	80.00	2,400.00
comforters	3	120.00	3,600.00
coffee table	1	150.00	1,500.00
arm chair	2	220.00	4,400.00
drapery set	1	95.00	950.00
crib	1	80.00	800.00

hanger set, perm	1	28.00	280.00
SUBTOTAL			57,880.00

BATHROOMS (Listing for one bathroom x ten suites)

shower curtain/rod	1	33.00	330.00
towel set	6	19.00	1,140.00
bath mat	1	28.00	280.00
trash can	1	11.00	110.00
SUBTOTAL			1,860.00

KITCHEN

Refrigerators	5	850.00	4,250.00
electric stove	3	370.00	1,110.00
microwaves	3	380.00	1,140.00
dishwasher	2	420.00	840.00
dish sets	10	60.00	600.00
pot/pan set	10	160.00	1,600.00
misc utensil set	10	45.00	450.00
towel/hot pad set	10	20.00	200.00
coffee pot, lg	2	100.00	200.00
toaster	3	40.00	120.00
can opener, elect	3	27.00	81.00

phone	1	29.00	29.00
glass set	10	25.00	250.00
trash can	5	16.00	160.00
iron	3	50.00	150.00
ironing board	3	24.00	72.00
dish rack	4	12.00	48.00
clock	1	60.00	60.00
sewing machine	1	200.00	200.00
SUBTOTAL			11,840.00

#### DINING ROOM

table	5	500.00	2,500.00
chair	20	300.00	6,000.00
highchair, baby	5	50.00	250.00
SUBTOTAL			8,750.00

#### LAUNDRY ROOM/SUPPLY PANTRY

washing machine	3	350.00	1,050.00
dryer	3	270.00	810.00
vacuum cleaner	1	150.00	150.00
mop	3	3.00	9.00
broom	3	4.50	13.50

dust pan	3	2.00	6.00
hvy duty mop	1	10.00	10.00
with bucket			

SUBTOTAL		2,048.00
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FAMILY ACTIVITY AREA

couch	3	400.00	1,200.00
lounge chair	5	220.00	1,100.00
love seat	5	350.00	1,750.00
baby swing	5	70.00	350.00
television	1	350.00	350.00
VCR	1	250.00	250.00
television stand	1	70.00	70.00
card table	2	450.00	900.00
card table chairs	4	160.00	640.00
coffee table	3	150.00	450.00
bookshelf	2	220.00	440.00
floor lamps	5	55.00	275.00
ping-pong table	1	150.00	150.00
toybox w/toys	1	200.00	200.00
clock	1	60.00	60.00

portable basket-	1	280.00	280.00
ball set w/stand			
baby playpen	2	50.00	100.00
SUBTOTAL			8,715.00

BEDROOMS	\$57,880.00
BATHROOMS	\$1,860.00
KITCHEN	\$11,840.00
LAUNDRY/SUPPLY	\$2,048.50
DINING ROOM	\$8,750.00
FAMILY AREA	\$8,715.00
TOTAL	\$90,737.50

The cost of carpet and decorative art were then added to the basic furnishing cost of \$90,737.50. The carpet quality selected costs \$18.00 per square foot. The total area to be carpeted is 5,630 square feet (uncarpeted areas include the kitchen, laundry, and supply pantry). Thus, the carpet expense equals \$101,340.00. A basic art package (framed prints) costing \$1.00 per square foot, was added for an additional \$7,7736.00.

The total estimated furnishing cost comes to:

FURNITURE AND HOUSEWARES	\$90,733.50
CARPET	\$101,340.00
ART PACKAGE	\$7,736.00
TOTAL	\$199,809.50
	<u>X</u> <u>.65</u> (for 35% discount)
TOTAL FOR FURNISHINGS	<u>\$129,876.18</u>

The next consideration in the project was the maintenance expenses of the facility. A general rule of thumb is that a facility will cost between 1.5 and 3.0% of the construction and furnishing cost to maintain (Haggin, 1994). Thus, this facility, with an average construction and furnishing cost of \$515,020.06, would require between \$7725.30 and \$15,450.60 for annual maintenance.

There are no costs associated with a permanent staff for a medical hotel. Room assignments would be handled by the post transient housing office as is the case for other on-post transient housing. Additionally, each family will be responsible for cleaning its assigned bedroom and bathroom suite and will share jointly in the responsibility to clean communal areas. Since this hotel would only add ten rooms to the approximately 900 transient rooms on post, this small addition could easily be managed by the existing transient housing staff.

Finally, there are no real estate costs since this estimate was made under the assumption that the facility would be located on Fort Sam Houston property which is still

relatively abundant.

The final design, size and cost estimates associated with the construction and operation of an on-post medical holding company hotel are shown below:

Number of families housed: 10

Total square feet required: 7,736

Construction cost range: \$48.12 per sq ft to \$51.45 per sq ft

Construction cost range: \$372,250.00 to \$398,037.76 total

Furnishings: \$129,876.18 or \$16.79 per sq ft

Maintenance costs: \$7,725.30 to \$15,450.60 per year

Total construction and furnishing costs: \$502,126.18 to \$527,913.94

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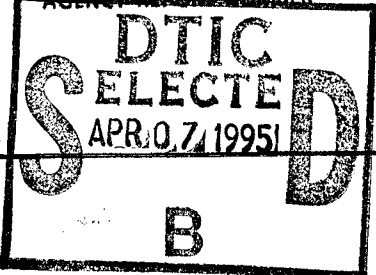
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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
<small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.</small>				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE May 1994		3. REPORT TYPE AND DATES COVERED Final Report (07-93 to 07-94)
4. TITLE AND SUBTITLE A Patient Care Model for Housing Medical Hold Patients Assigned to Brooke Army Medical Center			5. FUNDING NUMBERS	
6. AUTHOR(S) Major Dawn M. Smith, Medical Service Corps, US Army				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Brooke Army Medical Center Fort Sam Houston, Texas			8. PERFORMING ORGANIZATION REPORT NUMBER  3b-94	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army-Baylor University Graduate Program in Health Care Administration Academy of Health Sciences, US Army (HSHA-MH) Fort Sam Houston, Texas 78234-6100			10. SPONSORING/MONITORING AGENCY REPORT NUMBER 	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT  APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) Brooke Army Medical Center (BAMC) finds itself coping with a group of displaced patients who do not meet the criteria for remaining hospitalized. These displaced patients, assigned to the Medical Holding Company, are undergoing long-term rehabilitation regimens, or are awaiting processing through the Medical Evaluation Board process. BAMC maintains these displaced soldiers as inpatients due to a lack of feasible housing alternatives. This presents two major problems to the medical center. First, inpatient resources allotted to these displaced patients may be viewed as missed opportunities to treat new or additional patients. Second, patients and their families endure deleterious consequences such as negative psychological effects, separation, and financial hardships. The purpose of this study is to develop a patient care model describing the most efficient method for determining the most appropriate housing for displaced patients assigned to BAMC. There are two main study goals. The first is to maximize the medical benefit provided to medical hold patients and their families by providing the most appropriate housing for the patient's condition. The second goal is to minimize the resource drain of maintaining medical hold patients at BAMC.				
14. SUBJECT TERMS patient housing, medical hold, case management, algorithm			15. NUMBER OF PAGES 139	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT N/A	18. SECURITY CLASSIFICATION OF THIS PAGE N/A	19. SECURITY CLASSIFICATION OF ABSTRACT N/A	20. LIMITATION OF ABSTRACT UL	